

The digital version of the Soil Map of the Bent Creek Experimental Forest

Abstract

This document supplements the digital version of the Soil Map of the Bent Creek Experimental Forest by providing brief information on map production methods and complete descriptions of the 20 soil classification and mapping units.

PRODUCTION OF THE DIGITAL MAP

This digital version is based on conventional, stereoscopic photo-based, soil mapping prepared by a contract soil scientist and staff of the Bent Creek Experimental Forest:

USDA Forest Service. 2003. Soil map of the Bent Creek Experimental Forest. USDA Forest Service, Southern Research Station, Bent Creek Experimental Forest. Scale 1:12,000.

Conventional soil mapping was made on a 1:12,000 orthorectified aerial photography, which allowed accurate edge joining. Field mapping was done in 1991 by a contract soil scientist through the soil scientist of the Pisgah National Forest. Conventional methods were used for field mapping and each map unit was validated by sampling. Additional information on soils in the Bent Creek Experimental Forest is presented in the 20-page booklet "Supplementary Information for the Soil Map of the Bent Creek Experimental Forest" that is available as a PDF file.

The digital version of the conventional soil map was prepared by electronically scanning copies of the original aerial photos on which soil polygons had been delineated. Soil classification polygons were then digitized using the NC State Plane coordinate system, NAD 1927, with units of feet.

This digital version of the geologic map was produced in early 2003. The descriptions of map classification units were obtained from the U.S. Dept. Agriculture, NRCS, soil classification web page: "www.soils.usda.gov/technical/classification"

Official Soil Series Descriptions (OSD)

Introduction

"Official soil series description" is a term applied to the description approved by the Natural Resources Conservation Service that defines a specific soil series in the United States. These official soil series descriptions are descriptions of the taxa in the series category of the national system of classification. They mainly serve as specifications for identifying and classifying soils.

While doing survey work, field soil scientists should have all the existing official soil series descriptions that are applicable to their soil survey areas. Other official soil series descriptions that include soils in adjacent or similar survey areas are also commonly needed. Scientists in other disciplines, such as agronomists, horticulturists, engineers, planners, and extension specialists also use the descriptions to learn about the properties of soils in a particular area.

Additional information about the establishment and maintenance of official series descriptions can be found in the [National Soil Survey Handbook, Part 614.06](#)

Official Soil Series Descriptions (OSD)

Fact Sheet

Data Product Keywords

Soils, soil taxonomy, typical pedon, geographically associated soils, competing series, distribution and extent, range in characteristics, type location, drainage and permeability, use and management

Summary

The Official Soil Series Descriptions (OSD) is a national collection of more than 20,000 detailed soil series descriptions, covering the United States, Territories, Commonwealths, and Island Nations served by USDA-NRCS. The descriptions, in a text format, serve as a national standard.

The soil series is the lowest category of the national soil classification system. The name of a soil series is the common reference term, used to name soil map units. Soil series are the most homogenous classes in the system of taxonomy. "Official Soil Series Descriptions" define specific soil series in the United States, Territories, Commonwealths, and Island Nations served by USDA-NRCS. They are descriptions of the taxa in the series category of the national system of soil classification. They serve mainly as specification for identifying and classifying soils. The descriptions contain soil properties that define the soil series, distinguish it from other soil series,

serve as the basis for the placement of that soil series in the soil family, and provide a record of soil properties needed to prepare soil interpretations.

Extent of Program

National

Available Products Coverage

OSD are available for all soil series officially recognized in the United States, Territories, Commonwealths, and Island Nations served by USDA-NRCS.

Information Content

The OSD describe general and detailed information about each recognized soil in the United States, Territories, Commonwealths, and Island Nations served by USDA-NRCS, including location, author's initials, introductory paragraph, taxonomic classification, detailed soil profile description, location of the typical soil profile, range in characteristics, competing series, geographic setting, geographically associated soils, drainage and permeability, use and vegetation, distribution and extent, series established, remarks, and additional data.

Product Delivery Format

OSD are stored as unformatted ASCII text files and as html-formatted files.

Technical, Ordering, and Availability Information

The OSD are available through both the Web and through non-Web means. To obtain OSD through the Web, the URL for the NRCS soil survey data (through the USDA NRCS Soils Web site) is <http://soils.usda.gov/Soils/technical/classification/osd/index.html>. To obtain OSD through non-Web means, contact the USDA-NRCS State Office in your state.

The official descriptions follow for each of the 20 soil series mapped in Bent Creek Experimental Forest:

Ashe, Buladean, Chestnut, Cleveland, Clifton, Colvard, Cowee, Cullasaja, Evard, French, Iotla, Nikwasi, Porters, Reddies, Rosman, Saunook, Thurmont, Trimont, Tuckasegee, Unaka

ASHE

LOCATION ASHE

NC+GA MD SC TN VA

Established Series

DLN-RLM; Rev. MKC

08/2001

ASHE SERIES

The Ashe series consists of moderately deep, somewhat excessively drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and weathered from felsic or mafic igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. Mean annual air temperature is about 52 degrees F., and mean annual precipitation is about 50 inches near the type location. Slope ranges from 2 to 95 percent.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

TYPICAL PEDON: Ashe sandy loam--forested. (Colors are for moist soil unless otherwise stated.)

Oe--0 to 1 inches; moderately decomposed organic matter and leaves, twigs, and roots.

A1--1 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium and coarse granular structure; friable; many fine and medium roots; few quartz gravel; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

A2--4 to 8 inches; brown (10YR 4/3) sandy loam; weak medium granular structure; very friable; many fine and medium roots; few quartz gravel; few fine flakes of mica; very strongly acid; clear smooth boundary. (Combined thickness of the A horizon is 1 to 10 inches)

Bw--8 to 26 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium granular structure; friable; few small fragments of quartz rock which give gritty feel; common fine and medium roots; few fine flakes of mica; very strongly acid; clear wavy boundary. (10 to 30 inches thick)

C--26 to 31 inches; yellowish brown (10YR 5/4) saprolite that is sandy loam; massive; friable; common medium roots; fragments of granite gneiss; few fine flakes of mica; very strongly acid; gradual wavy boundary. (0 to 18 inches thick)

R--31 inches; hard, light colored granite gneiss.

TYPE LOCATION: Transylvania County, North Carolina; east side of Sapphire Road, 0.5 mile south of Windy Gap; USGS Cashiers Quadrangle; lat. 35 degrees, 5 minutes, 21 seconds N., and long. 83 degrees, 0 minutes, 30 seconds W.; NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 14 to 40 inches. Depth to lithic contact ranges from 20 to 40 inches. Content of rock fragments ranges from 0 to 35 percent by volume throughout. Reaction is extremely acid to moderately acid, unless limed. Content of flakes of mica is few or common throughout.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6. Where value is 3 or less, this horizon is less than 7 inches thick. The A horizon is loam, fine sandy loam, sandy loam, or coarse sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is loam, fine sandy loam, sandy loam, or coarse sandy loam in the fine-earth fraction.

The C horizon is saprolite weathered from felsic or intermediate crystalline rocks such as granite, granite gneiss, granodiorite, hornblende gneiss, or mica gneiss. It is similar in color to the Bw horizon or is multicolored. It may have the textures of the Bw horizon or be loamy sand, loamy fine sand, or loamy coarse sand in the fine-earth fraction. Some pedons do not have a C horizon.

The Cr horizon, where present, is multicolored, weathered bedrock that is partially consolidated but can be dug with hand tools with difficulty.

The R horizon is commonly hard, felsic or mafic igneous or high-grade metamorphic rock such as granite, granite gneiss, granodiorite, hornblende gneiss, amphibolite, high-grade metagraywacke, or mica gneiss. The upper boundary is considered as lithic contact where root spacing is greater than 4 inches.

COMPETING SERIES: These are the Brookfield, Buladean, Cardigan, Charlton, Chestnut, Delaware, Ditney, Dutchess, Edneyville, Foresthills (T), Gallimore, Greenbelt (T), Lordstown, Newport, Riverhead, Soco, St. Albans, Stecoah, Steinsburg, Wakeman, and Yalesville series. Brookfield soils have B horizons that are 7.5YR and redder. Buladean and Stecoah soils have paralithic contact at depths of 40 to 60 inches. Cardigan, Ditney, Lordstown, Steinsburg, and Yalesville soils have hard sedimentary or metasedimentary bedrock at depths less than 40 inches and contain fragments of those rocks. Charlton soils are very deep and formed in glacial till derived mainly from schist, gneiss, or granite. Chestnut soils have paralithic contact within depths of 20 to 40 inches but lack hard bedrock within these depths. Delaware soils are very deep and formed in postglacial alluvium, mainly from areas of sandstone, shale, and siltstone. Dutchess and St. Albans soils are very deep and contain coarse fragments of sedimentary rocks such as sandstone and shale. Edneyville soils are very deep. Foresthills (T) and Greenbelt (T) soils are very deep and have mantles of humanly transported materials. Gallimore soils are very deep and formed in loamy over sandy outwash on outwash plains. Newport soils are very deep and have C horizons of dense glacial till. Riverhead have a lithologic discontinuity in the upper 40 inches. Soco and Stecoah soils formed from materials weathered from low-grade metasedimentary rocks and contain fragments of those rocks. Wakeman soils formed in

residuum over sandstone bedrock on till plains and lake plains and contain fragments of sandstone.

GEOGRAPHIC SETTING: Ashe soils are on ridges and side slopes in the Blue Ridge (MLRA 130). Slopes commonly are greater than 50 percent but range from 2 to 95 percent. Elevation ranges from about 1,400 to 5,000 feet. Ashe soils formed in residuum that is affected by soil creep in the upper part and weathered from felsic or mafic igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. Estimated mean annual temperature is about 52 degrees F., and mean annual precipitation is about 50 inches near the type location. Mean annual air temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from 40 to 90 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Buladean, Chestnut and Edneyville series, these are the Brevard, Brownwood, Cashiers, Chandler, Cleveland, Cowee, Cullasaja, Edneytown, Evard, Fannin, Greenlee, Haywood, Hunt Dale, Micaville, Peaks, Pigeonroost, Plott, Porters, Saluda, Saunook, Tate, Thunder, Trimont, Tuckasegee, Tusquitee, Unaka, and Watauga soils. Brevard, Cowee, Edneytown, Evard, Pigeonroost, Saluda, Saunook, Tate, Trimont, and Watauga soils have argillic horizons. Brownwood, Cashiers, Chandler, Fannin, Micaville, and Watauga soils are in a micaceous or paramicaceous family. Cleveland and Saluda soils have bedrock within a depth of 20 inches. Cullasaja, Greenlee, Thunder, and Peaks soils are in a loamy-skeletal family. Haywood, Plott, Porters, Tuckasegee, and Unaka soils have umbric epipedons. Hunt Dale, Thunder, and Tusquitee soils have thicker humus-enriched ochric epipedons with color value of 3 or less. All these soils are on ridges and side slopes except for Brevard, Cullasaja, Greenlee, Haywood, Saunook, Tate, Thunder, Tuckasegee, and Tusquitee soils which are on colluvial benches, toe slopes, and fans. Also, soils on cooler, more humid north to east aspects on ridges and side slopes are Cashiers, Hunt Dale, Plott, Porters, Trimont, and Unaka.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; moderately rapid permeability; medium internal drainage. Runoff class is low on gentle slopes, medium on strong or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Common trees are black locust, chestnut oak, scarlet oak, eastern white pine, northern red oak, Virginia pine, and pitch pine. The understory species includes mountain laurel, rhododendron, and sourwood. Some areas are in pasture.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of North Carolina, Georgia, Maryland, South Carolina, Tennessee, and Virginia. The series is extensive.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Ashe County, North Carolina; 1912.

REMARKS: Ashe soils were formerly classified as Sols Bruns Acides.

The 12/97 revision places Ashe soils in an active family, based on similar soils such as Edneyville and Chestnut. Horizon depths were revised to standards of the most current revision of the Soil Survey Manual (issued 1993). The 2/99 revision updates classification to 8th Edition of Keys to Soil Taxonomy.

Diagnostic features and horizons recognized in this pedon are:

Ochric Epipedon - The zone from 0 to 8 inches (Oe, A1 and A2 horizons).

Cambic Horizon - The zone from 8 to 26 inches (Bw horizon).

Lithic Contact - The occurrence of hard bedrock at 31 inches.

ADDITIONAL DATA:

MLRA: 130 SIR(S): NC0019, NC0186 (VERY STONY)

Revised: 10/92-DLN-RLM-AG; 12/97-DHK; 2/99-MKC; 8/01-MKC

National Cooperative Soil Survey
U.S.A.

BULADEAN

LOCATION BULADEAN NC

Established Series
JBA:RHR:JAK; Rev. MKC
07/2001

BULADEAN SERIES

The Buladean series consists of deep, well drained soils with moderately rapidly permeability. They formed in residuum affected by soil creep in the upper part, that is weathered from felsic or mafic, high-grade metamorphic or igneous rock such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke.. These soils are on ridges and side slopes in the Blue Ridge (MLRA 130). Slope ranges from 8 to 95 percent. Mean annual precipitation is about 57 inches and mean annual air temperature is about 52 degrees F., near the type location.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

TYPICAL PEDON: Buladean loam, on a 42 percent, south-facing intermediate mountain side slope, elevation 3,800 feet--forested. (Colors are for moist soil unless otherwise stated.)

Oi--0 to 1 inch; slightly decomposed deciduous leaves and twigs. (0 to 3 inches thick)

Oe--1 to 2 inches; moderately decomposed deciduous leaves and twigs and very dark gray (10YR 3/1) decomposed organic matter. (0 to 3 inches thick)

A--2 to 5 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many very fine or fine, common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 2 percent by volume gravel; strongly acid; clear smooth boundary. (1 to 8 inches thick)

Bw1--5 to 22 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; common very fine to medium and few coarse roots; common very fine to medium and few coarse tubular pores; few fine flakes of mica; 5 percent by volume gravel; strongly acid; clear wavy boundary.

Bw2--22 to 28 inches; brown (7.5YR 4/4) coarse sandy loam; weak fine subangular blocky structure; friable; common very fine to coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent by volume gravel; strongly acid; gradual wavy boundary. (Combined thickness of the Bw horizon is 15 to 39 inches.)

C--28 to 52 inches; multicolored coarse sandy loam saprolite; massive; very friable; few very fine to medium and common coarse roots; few very fine to coarse tubular pores; few very fine

flakes of mica; 5 percent by volume gravel; strongly acid; abrupt smooth boundary. (0 to 40 inches thick)

Cr--52 to 88 inches; weathered, multicolored, partially consolidated biotite granitic gneiss that can be dug with difficulty with hand tools ; few fine and medium roots in cracks that are spaced more than 4 inches apart.

TYPE LOCATION: Mitchell County, North Carolina; about 4.0 miles north of Buladean on North Carolina Highway 226 to the North Carolina-Tennessee state line at Iron Mountain Gap; 0.7 mile southwest on U.S. Forest Service Road 5882 to a fork in the road; 0.2 mile west on USFS Road (right fork) in a road cut; Iron Mountain Gap USGS Quadrangle, lat., 36 degrees, 07 minutes, 04 seconds N., and long. 82 degrees, 14 minutes, 15 seconds W.

RANGE IN CHARACTERISTICS: Solum thickness commonly is 20 to 30 inches, but ranges from 20 to 40 inches. Depth to paralithic contact at the upper boundary of the Cr horizon ranges from 40 to 60 inches below the surface. Depth to lithic contact is greater than 60 inches. Content of flakes of mica is few or common throughout. Content of rock fragments, which are dominantly gravel, is less than 35 percent by volume throughout. Reaction ranges from extremely acid to moderately acid throughout, except where surface layers have been limed.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6 and chroma of 2 to 4. Where value is 3 or less , this horizon is less than 7 inches thick. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

The BA or BE horizon, where present, has hue of 7.5YR to 2.5Y, value of 4 to 6, chroma of 3 to 6. Texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, chroma of 4 to 8. Texture of the fine-earth fraction is sandy loam, fine sandy loam, coarse sandy loam, or loam.

The BC horizon, where present, has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8, or it is mixed or mottled in shades of these colors. Colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness. Texture of the fine-earth fraction is sandy loam, fine sandy loam, coarse sandy loam, or loam. Some pedons have a B/C horizon that consists of a BC or Bw horizon with pockets of loamy sand or sandy loam saprolite (C material).

The C horizon is multicolored saprolite or it has hue of 5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8 and may be mixed or mottled in shades of these colors. Colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness. Texture of the fine-earth fraction is loamy sand, sandy loam, or coarse sandy loam.

The Cr horizon is weathered, multicolored felsic or mafic, high-grade metamorphic or igneous rock that is partially consolidated but can be dug with difficulty with hand tools. The upper boundary is considered as a paralithic contact where root spacing is greater than 4 inches.

COMPETING SERIES: These are the Ashe, Brookfield, Cardigan, Charlton, Chestnut, Delaware, Ditney, Dutchess, Edneyville, Foresthills (T), Gallimore, Greenbelt (T), Lordstown, Newport, Riverhead, Soco, St. Albans, Stecoah, Steinsburg, Wakeman, and Yalesville series. Ashe soils have lithic contact within depths of 20 to 40 inches. Brookfield soils are very deep and formed in micaceous till. Cardigan, Lordstown, Steinsburg, and Yalesville soils have hard sedimentary or metasedimentary bedrock at depths less than 40 inches and contain fragments of those rocks. Charlton soils are very deep and formed in glacial till derived mainly from schist, gneiss, or granite. Chestnut soils have paralithic contact within depths of 20 to 40 inches. Delaware soils are very deep and formed in postglacial alluvium, mainly from areas of sandstone, shale, and siltstone and contain fragments of those rocks.. Dutchess and St. Albans soils are very deep, contain coarse fragments of sedimentary rocks such as sandstone and shale, and contain fragments of those rocks.. Edneyville soils are very deep. Foresthills (T) and Greenbelt (T) soils are very deep and have mantles of humanly transported materials. Gallimore soils are very deep and formed in loamy over sandy outwash on outwash plains. Newport soils have C horizons of dense glacial till. Riverhead have a lithologic discontinuity in the upper 40 inches. Ditney, Soco and Stecoah soils formed from materials weathered from low-grade metasedimentary rocks and contain fragments of those rocks. Wakeman soils formed in residuum over sandstone bedrock on till plains and lake plains and contain fragments of sandstone.

GEOGRAPHIC SETTING: Buladean soils are on ridges and side slopes on low and intermediate mountains in the Blue Ridge (MLRA130). Slopes are dominantly 30 to 70 percent, but range from 8 to 95 percent. Elevation ranges from about 1,400 to 5,000 feet. Buladean soils formed in residuum that is affected by soil creep in the upper part and weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. . The mean annual air temperature ranges from about 46 to 57 degrees F., the frost free season ranges from about 110 to 160 days, and the average annual rainfall ranges from about 48 to 64 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Ashe, Chestnut, and Edneyville series, these are the Brevard, Brownwood, Cashiers, Chandler, Cleveland, Cowee, Cullasaja, Evard, Fannin, Greenlee, Haywood, Hunt Dale, Micaville, Plott, Porters, Saluda, Saunook, Tate, Thunder, Trimont, Tuckasegee, Tusquitee, Unaka, and Watauga soils. Brevard, Cowee, Evard, Saluda, Saunook, Tate, Trimont, and Watauga soils have an argillic horizon. Brownwood, Cashiers, Chandler, Fannin, Micaville, and Watauga soils are in a micaceous or paramicaceous family. Cleveland and Saluda soils have bedrock within a depth of 20 inches. Cullasaja and Greenlee soils are in a loamy-skeletal family. Haywood, Plott, Porters, Tuckasegee, and Unaka soils have umbric epipedons. Hunt Dale, Thunder, and Tusquitee soils have thicker humus-enriched ochric epipedons with color value of 3 or less. All these soils are on ridges and side slopes except for Brevard, Cullasaja, Greenlee, Haywood, Saunook, Tate, Thunder, Tuckasegee, and Tusquitee soils which are on colluvial benches, toe slopes, and fans. Also, soils on cooler, more humid north to east aspects on the ridges and side slopes are Cashiers, Hunt Dale, Plott, Porters, Trimont, and Unaka.

DRAINAGE AND PERMEABILITY: Well drained; slow runoff where forest litter has not been disturbed, and medium to rapid runoff where litter is significantly disturbed or removed; moderately rapid permeability.

USE AND VEGETATION: Most areas of Buladean soils are forested. Common trees are chestnut oak, white oak, black oak, hickory, red maple, black locust, scarlet oak, eastern white pine, Virginia pine, and pitch pine. Yellow poplar and northern red oak are common in the northern portions of MLRA 130. The understory includes flowering dogwood, mountain-laurel, rhododendron, and sourwood. Cleared areas are used for pasture, and occasionally orchard, and ornamental crop production.

DISTRIBUTION AND EXTENT: North Carolina, and possibly Georgia, South Carolina, Tennessee, and Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Mitchell County, North Carolina; 1992.

REMARKS: Soils now included with the Buladean series were previously mapped with Edneyville soils. Edneyville soils do not have weathered bedrock and paralithic contact within a depth of 60 inches. The particle size control section of many pedons has a weighted average clay content marginal to fine-loamy. Similar soils in a fine-loamy family are associated on some landscapes.

The 2/99 revision updates classification to the 8th Edition of Keys to Soil Taxonomy. This soil is placed in the active CEC activity class based on comparison with similar associated soils such as Edneyville and Chestnut. Sampled pedon S88NC-121-007 classifies as superactive, but the active class is consistent with similar series.

Diagnostic horizons and soil characteristics recognized in this pedon are:

Ochric epipedon - the zone from the soil surface to a depth of 5 inches (Oi, Oe, and A horizons)

Cambic horizon - the zone between from 5 to 28 inches (Bw1 and Bw2 horizons)

Paralithic contact - weathered bedrock contact at 52 inches (upper boundary of the Cr horizon)

SIR = NC0243 MLRA = 130

ADDITIONAL DATA: Characterization data is available from the National Soil Survey Laboratory, Lincoln, NE; pedon number S88NC-121-007.

National Cooperative Soil Survey
U.S.A.

CHESTNUT

LOCATION CHESTNUT NC+GA TN VA

Established Series
JMO;Rev. MKC
06/2003

CHESTNUT SERIES

The Chestnut series consists of moderately deep, well drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke.. Near the type location, mean annual air temperature is about 51 degrees F., and mean annual precipitation is about 54 inches. Slopes range from 2 to 95 percent.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

TYPICAL PEDON: Chestnut gravelly loam--forested. (Colors are for moist soil)

Oi--0 to 2 inch; slightly decomposed organic matter and leaves, twigs, and roots.

A--2 to 8 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak medium granular structure; very friable; many fine and medium roots; 20 percent granite gneiss gravel by volume; few fine flakes of mica; very strongly acid; clear wavy boundary. (1 to 10 inches thick)

Bw--8 to 32 inches; yellowish brown (10YR 5/6) gravelly loam; weak medium subangular blocky structure; very friable; common fine roots; 20 percent granite gneiss gravel by volume; few fine flakes of mica; very strongly acid; clear wavy boundary. (10 to 30 inches thick)

Cr--32 to 74 inches; multicolored weathered granite gneiss that can be dug with difficulty with hand tools; rock structure; partly consolidated in place; few fine roots in cracks; cracks are more than 4 inches apart; few fine flakes of mica; very strongly acid. (10 to 50 inches thick)

R--74 inches; hard granite gneiss.

TYPE LOCATION: Caldwell County, North Carolina; 2.5 miles south of Blowing Rock on Globe Road (State Road 1367); 0.6 mile north of Tolbert Cemetery; 500 feet northwest of USFS trail; on north side of trail.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 15 to 39 inches. Depth to paralithic contact at the upper boundary of the Cr horizon ranges from 20 to 40 inches below the surface. Depth to lithic contact is more than 40 inches. Reaction is extremely acid to moderately

acid. Content of rock fragments ranges from 0 to 35 percent by volume throughout. Content of mica flakes is few or common throughout.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6. Where value is 3 or less, this horizon is less than 7 inches thick.. The A horizon is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

Some pedons have an AB or BA horizon. Hue is 7.5YR to 2.5Y, value of 3 to 5, and chroma of 3 or 4. Textures are the same as for the A horizon.

The Bw horizon, and BC horizon where present, has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8. It is dominantly sandy loam, fine sandy loam, or loam in the fine-earth fraction. Some pedons have thin subhorizons of sandy clay loam.

The C horizon, where present, is similar in color to the Bw horizon or is multicolored. It is saprolite that is loam, sandy loam, fine sandy loam, loamy sand, or loamy fine sand in the fine-earth fraction.

The Cr horizon is multicolored weathered felsic to mafic igneous or high-grade metamorphic rock such as granite, hornblende gneiss, granodiorite, gneiss, high-grade metagraywacke, and high-grade metasandstone. It is partly consolidated but can be dug with difficulty with hand tools. The upper boundary is considered as a paralithic contact where root spacing is greater than 4 inches.

COMPETING SERIES: These are the Ashe, Brookfield, Buladean, Cardigan, Charlton, Delaware, Ditney, Dutchess, Edneyville, Foresthills (T), Gallimore, Greenbelt (T), Lordstown, Newport, Riverhead, Soco, St. Albans, Stecoah, Steinsburg, Wakeman, and Yalesville series. Ashe soils have lithic contact within depths of 20 to 40 inches. Brookfield and Edneyville soils are very deep. Buladean and Stecoah soils have paralithic contact with weathered bedrock at depths of 40 to 60 inches. Cardigan, Lordstown, Steinsburg, and Yalesville soils have hard sedimentary or metasedimentary bedrock at depths less than 40 inches and contain fragments of those rocks. Charlton soils are very deep and formed in glacial till derived mainly from schist, gneiss, or granite. Delaware soils are very deep and formed in postglacial alluvium, mainly from areas of sandstone, shale, and siltstone. Ditney, Soco and Stecoah soils formed from materials weathered from low-grade metasedimentary rocks and contain fragments of those rocks. Dutchess and St. Albans soils are very deep and contain coarse fragments of sedimentary rocks such as sandstone and shale. Foresthills (T) and Greenbelt (T) soils are very deep and have mantles of humanly transported materials. Gallimore soils are very deep and formed in loamy over sandy outwash on outwash plains. Newport soils have C horizons of dense glacial till. Riverhead have a lithologic discontinuity in the upper 40 inches.

GEOGRAPHIC SETTING: Chestnut soils are gently sloping to very steep and are on ridges and side slopes of the Blue Ridge (MLRA 130). Elevations range from about 1,400 to 5,000 feet. Slopes are generally between 15 and 95 percent, but range from 2 to 95 percent. Chestnut soils formed in residuum that is affected by soil creep in the upper part and weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granodiorite, granite, hornblende gneiss,

biotite gneiss, and high-grade metagraywacke. Mean annual air temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from 48 to 64 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Ashe, Buladean, and Edneyville series, these are the Brevard, Brownwood, Cashiers, Chandler, Cleveland, Cowee, Cullasaja, Edneytown, Evard, Fannin, Greenlee, Haywood, Hunt Dale, Micaville, Pigeonroost, Plott, Porters, Saluda, Saunook, Tate, Thunder, Trimont, Tuckasegee, Tusquitee, Unaka, and Watauga soils. Brevard, Cowee, Edneytown, Evard, Pigeonroost, Saluda, Saunook, Tate, Trimont, and Watauga soils have an argillic horizon. Brownwood, Cashiers, Chandler, Fannin, Micaville, and Watauga soils are in a micaceous or paramicaceous family. Cleveland and Saluda soils have bedrock within a depth of 20 inches. Cullasaja and Greenlee soils are in a loamy-skeletal family. Haywood, Plott, Porters, Tuckasegee, and Unaka soils have umbric epipedons. Hunt Dale, Thunder, and Tusquitee soils have thicker humus-enriched ochric epipedons with color value of 3 or less. All these soils are on ridges and side slopes except for Brevard, Cullasaja, Greenlee, Haywood, Saunook, Tate, Thunder, Tuckasegee, and Tusquitee soils which are on colluvial benches, toe slopes, and fans. Also, soils on cooler, more humid north to east aspects on the ridges and side slopes are Cashiers, Hunt Dale, Plott, Porters, Trimont, and Unaka.

DRAINAGE AND PERMEABILITY: Well drained; moderately rapid permeability. Runoff class is low on gentle slopes, medium on strong or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest cover is intact.

USE AND VEGETATION: Most of the soil is in forest. Common trees are scarlet oak, chestnut oak, white oak, black oak, hickory, eastern white pine, Virginia pine, and pitch pine. Yellow poplar and northern red oak are common in the northern portions of MLRA 130. The understory species are dominantly rhododendron, mountain laurel, flowering dogwood, sourwood, chestnut sprouts, and buffalo nut. A small acreage is cleared and used for pasture, small grain, and hay.

DISTRIBUTION AND EXTENT: The Blue Ridge (MLRA 130) of North Carolina, Georgia, Tennessee and Virginia and possibly South Carolina. This series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Caldwell County, North Carolina, 1983.

REMARKS: The series was formerly included with the Ashe series. Field studies indicate that Chestnut soils have significantly higher forest productivity than Ashe soils. A dominance of pedons have clay contents around 18 percent. Similar soils with clay contents that would be in a fine-loamy family are associated on some landscapes. These would be taxadjuncts to the series or included similar soils in map units.

The 12/97 revision changes the family placement to coarse-loamy, mixed, active, mesic Typic Dystrochrepts per the 7th Edition of Keys to Soil Taxonomy (1996). The CEC activity class placement is based on three pedons; S88-NC-121-005; S91-NC-111-002; and S77-TN-171-004. All three pedons have control section clay contents over 18%. Two of the three are in the active family while one is in the semiactive family. Since these soils may best fit Pigeonroost,

additional future lab data may place Chestnut soils in a semiactive family. Horizon depths and runoff class were also revised at this time. The 2/99 revision updates classification to 8th Edition of Keys to Soil Taxonomy.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to a depth of 8 inches (Oi and A horizons)

Cambic horizon - the zone between depths of 8 and 32 inches (Bw horizon)

Paralithic contact - The occurrence of soft bedrock at a depth of 32 inches (upper boundary of the Cr horizon)

ADDITIONAL DATA:

MLRA: 130 SIR(s): NC0166, NC0242 (Stony)

Revised: 10/92-JMO,AG; 12/97-DHK; 2/99, 6/00, 8/01-MKC

National Cooperative Soil Survey
U.S.A.

CLEVELAND

LOCATION CLEVELAND

SC+NC TN

Established Series
RLV-DJD;Rev. MKC
07/2001

CLEVELAND SERIES

The Cleveland series consists of shallow, somewhat excessively drained, moderately rapidly permeable soils affected by soil creep. They formed in residuum weathered from felsic or mafic igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. Slopes range from 8 to 95 percent.

TAXONOMIC CLASS: Loamy, mixed, active, mesic Lithic Dystrudepts

TYPICAL PEDON: Cleveland sandy loam--forested (66 percent slope.) (Colors are for moist soil.)

A--0 to 5 inches; very dark brown (10YR 2/2) sandy loam; moderate medium granular structure; very friable; common fine flakes of mica; 10 percent pebbles of granite-gneiss 2 to 40 mm in size; the 20 to 40 mm size pebbles are thin and platy; many fine and medium roots; moderately acid; clear smooth boundary. (3 to 8 inches thick)

Bw--5 to 14 inches; brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; few fine flakes of mica; 15 percent pebbles of granite-gneiss; larger fragments are thin and platy; many medium roots; medium and coarse sand grains coated with fine sand and silt grains; moderately acid; abrupt irregular boundary. (5 to 15 inches thick)

R--14 inches; hard granite-gneiss rock.

TYPE LOCATION: Greenville County, South Carolina; 20 miles north of Greenville; 400 feet south of South Carolina Secondary Highway 118; 3.2 miles northeast (along Highway 118) of South Carolina Secondary Highway 42.

RANGE IN CHARACTERISTICS: Solum thickness and depth to lithic contact range from 10 to 20 inches. Content of rock fragments ranges from 0 to 35 percent by volume throughout. The soil is extremely acid to moderately acid throughout the profile. Content of flakes of mica is few or common throughout.

The A horizon has hue of 7.5YR or 2.5Y, value of 2 to 6, and chroma of 1 to 6. Where value is 3 or less, this horizon is less than 7 inches thick. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. Some pedons have A thin A horizon that is loamy sand.

Some pedons have a thin E horizon with hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The C horizon, where present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4, or it is multicolored. It is as much as 6 inches thick. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The R horizon is commonly hard, felsic or mafic igneous or high-grade metamorphic rock such as granite, granite gneiss, granodiorite, hornblende gneiss, amphibolite, high-grade metagraywacke, or mica gneiss. The upper boundary is considered as lithic contact where root spacing is greater than 4 inches.

COMPETING SERIES: These are the Brimfield, Hollis, and Kearsarge series, and the Catlett, Elkmound, Holyoke, Ramsey, and Unicoi series in related families. Brimfield soils formed in sandstone. Catlett and Unicoi soils have more than 35 percent rock fragments in the particle-size control section. Elkmound soils are in a superactive CEC class and are underlain by sandstone and generally have rock fragments of sandstone. Hollis soils average more than 20 percent silt in the particle-size control section. Holyoke soils are in a subactive CEC class and formed in sandstone or basalt. Kearsarge soils have less sand and are underlain by phyllite. Ramsey soils have siliceous mineralogy.

GEOGRAPHIC SETTING: Cleveland soils are on convex and uneven slopes, dominantly 50 to 95 percent, at elevations ranging from 1,400 to 5,000 feet in the Blue Ridge (MLRA 130). . These soils are affected by soil creep and formed in material weathered from felsic or mafic, igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. Mean annual precipitation ranges from about 40 to 90 inches, mean annual temperature ranges from 46 to 57 degrees F

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brevard, Brownwood, Buladean, Cashiers, Chandler, Chestnut, Cleveland, Cowee, Cullasaja, Edneyville, Evard, Fannin, Greenlee, Haywood, Hunt Dale, Micaville, Peaks, Plott, Porters, Saluda, Saunook, Tate, Thunder, Trimont, Tuckasegee, Tusquitee, Unaka, Walhalla, and Watauga soils. All of these associated soils are more than 20 inches to lithic contact. Additionally, Brevard, Cowee, Evard, Fannin, Saluda, Saunook, Tate, Trimont, Walhalla, and Watauga soils have an argillic horizon.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; moderately rapid permeability. Runoff class is very high. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Common trees are chestnut oak, scarlet oak, hickory, eastern white pine, Virginia pine, and pitch pine. The understory includes rhododendron and mountain laurel.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of South Carolina and North Carolina, and possibly Maryland and Virginia. The series is moderately extensive.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Greenville County, South Carolina; 1972.

REMARKS: The 12/97 revision places this soil in the loamy, mixed, active, mesic Lithic Dystrochrepts family per 7th Edition of Keys to Soil Taxonomy (1996). CEC activity class placement was based on information provided from sampled pedons of soils forming in similar materials (Ashe, Edneyville, Chestnut). The 2/99 revision updates classification to 8th Edition of Keys to Soil Taxonomy.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to a depth of 5 inches (A horizon).

Cambic horizon - the zone from 5 to 14 inches (Bw horizon).

Lithic Contact - the occurrence of hard bedrock at 14 inches (R horizon).

ADDITIONAL DATA:

MLRA: 130 SIR(s): SC0084

Revised 11/92-RLV,DJD; 12/97-DHK; 2/99, 7/00-MKC

National Cooperative Soil Survey
U.S.A.

CLIFTON

LOCATION CLIFTON

NC+GA SC TN VA WV

Established Series

Rev. AG-MKC

02/2002

CLIFTON SERIES

The Clifton series consists of very deep, well drained, moderate permeability soils on ridges and side slopes of the Blue Ridge (MLRA 130). Slopes are 2 to 50 percent. They formed in residuum weathered from intermediate and mafic igneous and high-grade metamorphic rocks that are high in ferromagnesium minerals. Near the type location mean annual air temperature is about 51 degrees F., and mean annual precipitation is about 53 inches.

TAXONOMIC CLASS: Fine, mixed, semiactive, mesic Typic Hapludults

TYPICAL PEDON: Clifton loam--cultivated. (Colors are for moist soils unless otherwise stated.)

Ap--0 to 5 inches; brown (7.5YR 4/4) loam; weak medium granular structure; very friable; common fine roots; many fine pores; few fine flakes of mica; few small pebbles; strongly acid; clear smooth boundary. (4 to 10 inches thick)

BA--5 to 10 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few fine flakes of mica; strongly acid; clear smooth boundary. (0 to 7 inches thick)

Bt1--10 to 23 inches; red (2.5YR 5/6) clay; moderate medium subangular blocky structure; friable; thin continuous clay films on faces of peds; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt2--23 to 38 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; thin continuous clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary. (Combined thickness of the Bt horizon is 15 to 45 inches.)

BC--38 to 45 inches; red (2.5YR 4/6) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; strongly acid; gradual wavy boundary. (0 to 10 inches thick)

C--45 to 65 inches; mottled yellowish red (5YR 5/6) and strong brown (7.5YR 5/8) saprolite that is fine sandy loam; common fine flakes of mica; strongly acid.

TYPE LOCATION: Ashe County, North Carolina; 9 miles southeast of Jefferson on N.C. Highway 88, 1000 yards north of Ebenezer Church on State Road 1623, 20 feet west of road.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 30 to more than 60 inches. Depth to bedrock is greater than 60 inches. Reaction ranges from very strongly acid to slightly acid, except where surface layers have been limed. Content of flakes of mica is few or common throughout. Content of coarse fragments ranges from 0 to 35 percent by volume throughout.

The A1 or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. Where value is 3, the horizon is less than 7 inches thick. The A horizon is loam or fine sandy loam in the fine earth fraction.

The E horizon, where present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Texture is loam, fine sandy loam, or sandy loam in the fine earth fraction.

The BA horizon, where present, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Texture is loam, clay loam, or sandy clay loam.

The Bt horizon has hue of 10R to 5YR, value of 4 to 5, and chroma of 6 or 8. Texture is clay loam, clay, or sandy clay.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 6 or 8. It is loam, sandy clay loam, or clay loam.

The C horizon is saprolite that is multicolored, or similar in color to the BC horizon. It is loam or fine sandy loam. Some pedons have non-redoxamorphic mottles in shades of brown, white, and red.

COMPETING SERIES: These are the Appomattox, Braddock, Buffstat, Christian, Clover (T), Danripple (T), Flagspring (T), Howell, Totier, Unison, Warminster, and Yellowbottom (T) series. Appomattox soils have a mantle of colluvium over residuum at least 3 feet thick. Braddock and Unison soils formed in colluvium or old alluvium on toe slopes, fans, and high stream terraces. Buffstat soils formed in residuum from fine grained metamorphic rocks and contain a high amount of silt. Christian soils formed in residuum from interbedded limestone, sandstone, siltstone, and shale and contain fragments of these rocks. Clover soils formed in residuum from Triassic materials and contain fragments of these rocks. Danripple soils formed in alluvium on stream terraces and have a seasonal high water table between 40 and 60 inches. Flagspring and Yellowbottom soils do not have an official series description at this time. Howell soils formed in unconsolidated sediments containing diatomaceous earth and/or glauconite. Totier and Warminster soils have a paralithic contact between 40 and 60 inches.

GEOGRAPHIC SETTING: Clifton soils are on gently sloping to steep ridges and side slopes of intermountain hills and low mountains of the Blue Ridge (MLRA 130). Elevations range from 1,400 to 4,000 feet. Slopes are typically between 8 and 30 percent but range from 2 to 50 percent. They formed in residuum weathered from intermediate and mafic igneous and high-grade metamorphic rocks high in ferromagnesium minerals such as hornblende gneiss and

amphibolite. The mean annual temperature ranges from about 46 to 57 degrees F., and mean annual precipitation ranges from about 35 to 60 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Braddock and Unison series, these are the Bandana, Brevard, Chandler, Cowee, Evard, Fannin, French, Hunt Dale, Micaville, Saunook, and Watauga series. Bandana and French soils are somewhat poorly drained and are on narrow floodplains. Brevard and Saunook soils formed in colluvium or alluvium on toe slopes, benches, and fans are in a fine-loamy particle-size class. Chandler, Cowee, Evard, Fannin, Hunt Dale, and Micaville, soils are on uplands. Chandler, Micaville, Fannin, and Watauga soils are in a micaceous and paramicaceous mineralogy class, respectively. Cowee and Evard soils are in a fine-loamy particle-size class. Hunt Dale and Saunook soils are in a fine-loamy particle-size class, have a thick dark surface horizon with value 3 or less. Hunt Dale soils are on side slopes of cooler, north to east aspects.

DRAINAGE AND PERMEABILITY: Well drained; moderate to rapid runoff; medium internal drainage; moderate permeability.

USE AND VEGETATION: About one-half of the area of this soil is forested. The dominant trees are yellow poplar, eastern white pine, scarlet oak, pitch pine, Virginia pine, and shortleaf pine. The dominant understory is rhododendron, mountain laurel, flowering dogwood, sourwood, serviceberry, American holly, red maple, and black locust. Cleared areas are used for pasture, corn, and hayland. Some areas are in burley tobacco, small grains, and vegetable crops..

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of North Carolina, Virginia, South Carolina, and Georgia in the Southern Appalachian Mountains. The series has large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Ashe County, North Carolina; 1912.

REMARKS: Limited data for Clifton shows the mean pH of the B horizon to be 5.8, with a range of 5.5 to 6.2.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - 0 to 10 inches (Ap, BA horizons)

Argillic horizon - 10 to 38 inches (Bt horizon)

ADDITIONAL DATA: NSSL sample pedons: S87NC-199-002; S87NC-121-003; S87NC-199-004; S87NC-121-006; S87NC-009-001.

MLRA = 130 SIR = NC0015

National Cooperative Soil Survey
U.S.A.

COLVARD

LOCATION COLVARD

NC+GA VA

Established Series
Rev. JMO-EOB-MKC
04/2001

COLVARD SERIES

The Colvard series consists of very deep, well drained soils that formed in loamy alluvium on flood plains in the southern Appalachian Mountains. The mean annual air temperature is 50 degrees F., and the average annual rainfall is 52 inches near the type location. Slopes range from 0 to 4 percent.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, nonacid, mesic Typic Udifluvents

TYPICAL PEDON: Colvard fine sandy loam--cultivated. (Colors are for moist soil.)

Ap--0 to 10 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; common fine roots; few fine flakes of mica; medium acid; abrupt smooth boundary. (6 to 15 inches thick)

C1--10 to 26 inches; brown (7.5YR 4/4) fine sandy loam; weak medium granular structure; very friable; few fine roots; common fine flakes of mica; slightly acid; clear smooth boundary.

C2--26 to 42 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; few fine roots; common fine flakes of mica; few fine lenses of dark gray sand; neutral; clear smooth boundary.

C3--42 to 47 inches; yellowish brown (10YR 5/4) loamy sand; massive; very friable; common fine flakes of mica; slightly acid; gradual wavy boundary.

C4--47 to 60 inches; brown (10YR 5/3) cobbly sand, single grained; loose; few fine flakes of mica; 15 percent by volume rounded cobbles of quartz; few thin strata of sandy loam; slightly acid.

TYPE LOCATION: Ashe County, North Carolina; 9 miles east of Jefferson on NC 221, 2 miles west of Scottsville on NC 221, 450 yards south of NC 221, 100 yards east of New River.

RANGE IN CHARACTERISTICS: The loamy sediments range from 40 to 60 inches or more in thickness over deposits of stratified sandy, loamy, gravelly, or cobbly sediments. Rock fragments range from 0 to 15 percent to a depth of 40 inches, and from 0 to 80 percent below 40 inches. Flakes of mica range from few to common throughout the control section. The soil ranges from strongly acid to mildly alkaline.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 6. Where the value is 3 and the chroma is 2 or 3, the horizon is less than 7 inches thick. The A horizon is sandy loam, fine sandy loam, or loam. Some pedons have an Ab horizon that has the same texture and color range as the A horizon.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Some pedons have redoximorphic features of iron depletions and masses of accumulation in shades of yellow, brown, or gray below 40 inches. Within a depth of 40 inches, the C horizon is dominantly sandy loam, fine sandy loam, or loam. Some pedons have thin strata (less than 5 inches thick) of loamy sand or sand. Below 40 inches, the C horizon may consist of stratified sandy or loamy sediments that range from 0 to 80 percent by volume rock fragments. The rock fragments are mainly gravel and cobbles.

COMPETING SERIES: These are the Kickapoo and Wirt series in the same family and the Arkaqua, Biltmore, Codorus, Comus, Congaree, French, Rosman, Suches, Toccoa, and Transylvania series in closely related families. Arkaqua, Codorus, Congaree, French, Suches, and Transylvania series have more than 18 percent clay in the control section. In addition, French soils have contrasting textures within one meter. Biltmore soils are sandy. Comus soils have a cambic horizon. Kickapoo soils have buried A horizons at 20 to 40 inches. Rosman soils have an umbric epipedon. Toccoa soils have mean annual temperatures of more than 59 degrees F. Wirt soils formed in alluvium from glacial till.

GEOGRAPHIC SETTING: Colvard soils are on flood plains of mountain valleys in the southern Appalachian Mountains. Slopes range from 0 to 4 percent. The soils formed in loamy and sandy sediments. The mean annual air temperature ranges from 46 to 57 degrees F., and the mean annual precipitation ranges from 38 to 65 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These include the Biltmore, Iotla, Ostin, Tate, Toxaway, and Tusquee series. Biltmore and Ostin soils are sandy and are generally adjacent to streams. Iotla soils have mottles of 2 or lower chroma within 20 inches of the surface and are in slightly lower positions. Tate soils have an argillic horizon and Tusquee soils have a cambic horizon. These soils are on fans, foot slopes, and benches adjacent to the flood plain. Toxaway soils have a dominant matrix color of chroma 2 or less. These soils occupy the lower parts of the flood plain.

DRAINAGE AND PERMEABILITY: Well drained; slow surface runoff; moderately rapid permeability; flooding is occasional.

USE AND VEGETATION: Most of the acreage of this soil is cleared and used for pasture and crops. Important crops grown are corn for grain and silage, small grains, truck crops, burley tobacco, and pasture. Common forest species include yellow-poplar, northern red oak, black oak, white oak, eastern white pine, American sycamore, river birch, white ash, black locust, basswood, and blackgum. Rhododendron, red maple, and blueberry are common understory plants.

DISTRIBUTION AND EXTENT: Flood plains of the southern Appalachian Mountains of Georgia, North Carolina, South Carolina, Tennessee, and Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Ashe County, North Carolina, 1981.

REMARKS: The Colvard series confines similar soils of the Comus series to regions other than MLRA 130. Soils previously correlated as Comus within MLRA 130 are covered by this series. The 2/99 revision updates classification to 8th Edition of Keys to Soil Taxonomy. This soil is placed in the active CEC activity family based on comparison with other soils.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 10 inches below the surface (Ap horizon)

Nonacid feature - pH of 5.5 or more in the 10 to 40 inch control section

MLRA: 130 SIR: NC0105

National Cooperative Soil Survey
U.S.A.

COWEE

LOCATION COWEE

NC+GA VA

Established Series
MLS; Rev. MKC
06/2003

COWEE SERIES

The Cowee series consists of moderately deep, well drained, moderately permeable soils on ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum affected by soil creep in the upper part, and weathered from felsic to mafic, igneous and high-grade metamorphic rocks. Slope ranges from 2 to 95 percent. Near the type location, mean annual temperature is about 56 degrees F., and mean annual precipitation is about 49 inches.

TAXONOMIC CLASS: Fine-loamy, parasesquic, mesic Typic Hapludults

TYPICAL PEDON: Cowee gravelly sandy loam--forested. (Colors are for moist soil).

Oi--0 to 2 inch; slightly decomposed leaves, twigs, roots, and other organic matter.

A--2 to 7 inches; reddish brown (5YR 4/4) gravelly sandy loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent by volume gneiss gravel; common fine and medium flakes of mica; strongly acid; clear wavy boundary. (1 to 10 inches thick)

Bt1--7 to 15 inches; red (2.5YR 4/8) gravelly sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; common faint clay films on faces of peds; 20 percent by volume gneiss gravel; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

Bt2--15 to 29 inches; red (2.5YR 5/8) gravelly sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common faint clay films on faces of peds; 30 percent by volume gneiss gravel; common fine and medium flakes of mica; strongly acid; abrupt wavy boundary. (Combined thickness of the Bt horizons is 10 to 28 inches.)

Cr--29 to 62 inches; weathered, multicolored hornblende gneiss; that can be dug with difficulty with hand tools; rock structure; partly consolidated in place; few fine roots in cracks; cracks are more than 4 inches apart.

TYPE LOCATION: Jackson County, North Carolina; 1.1 miles northeast of Cullowhee from the Tuckasegee River on old N.C. Highway 107; 1.7 miles north of Black Mountain Baptist Church; 0.5 mile north on U.S. Forest Service access road and 500 feet east on U.S. Forest Service Trail, 25 feet north of trail.

RANGE IN CHARACTERISTICS: The solum is 15 to 39 inches thick. Depth to paralithic contact at the upper boundary of the Cr horizon ranges from 20 to 40 inches below the surface. Depth to lithic contact is more than 40 inches.

The A horizons are extremely acid to moderately acid except where surface layers have been limed, and the B and C horizons are very strongly acid or strongly acid. Content of flakes of mica ranges from few to common throughout. Content of rock fragments ranges from 0 to 35 percent by volume throughout.

The A horizon has hue of 10YR to 5YR, value of 3 to 5, and chroma of 2 to 8. Where value is 3 or less, this horizon is less than 7 inches thick. This horizon is commonly loam, fine sandy loam, or sandy loam in the fine earth fraction.

The E horizon, where present, has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is loam, sandy loam, or fine sandy loam in the fine earth fraction.

The BA horizon or BE horizon, where present, has hue of 5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is loam, sandy loam, or fine sandy loam in the fine earth fraction.

The Bt horizon has hue of 2.5YR to 5YR, value of 4 to 6, and chroma of 4 to 8. In addition, subhorizons of the Bt horizon, but not the entire Bt horizon, may have hue of 7.5YR, value of 4 to 6, and chroma of 4 to 8. The Bt horizon is sandy clay loam, loam, clay loam, sandy loam, or fine sandy loam in the fine earth fraction.

The BC horizon, where present, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or sandy clay loam in the fine earth fraction.

The C/Bt horizon, where present, has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8; or it is multicolored. Non-redoximorphic mottles in shades of red, brown, or yellow are in some pedons. In the C part, it is saprolite that has a texture of sandy loam, fine sandy loam, or loam in the fine earth fraction. In the Bt part, texture is loam or sandy clay loam.

The C horizon, where present, has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8; or it is multicolored. Non-redoximorphic mottles in shades of red, brown, or yellow are in some pedons. It is saprolite that has a texture of sandy loam, fine sandy loam, or loam in the fine earth fraction.

The Cr horizon is weathered, multicolored felsic to mafic, igneous and high-grade metamorphic rock. It is partly consolidated but can be dug with difficulty with hand tools. The upper boundary is considered as a paralithic contact. Roots, where present, are in cracks or seams spaced more than 4 inches apart.

COMPETING SERIES: These are the Brevard, Evard, Stott Knob (T), and Walhalla series. Brevard, Evard, and Walhalla soils are very deep (greater than 60 inches) to weathered bedrock. Stott Knob soils formed in residuum from metamorphic and igneous rocks at lower elevations in the Southern Piedmont (MLRA 136).

GEOGRAPHIC SETTING: Cowee soils are on gently sloping to very steep ridges and side slopes of low and intermediate mountains in the Blue Ridge (MLRA 130). Elevations range from 1,400 to 4,000 feet. Slopes are typically between 15 and 50 percent but range from 2 to 95 percent. Cowee soils formed in residuum that is affected by soil creep in the upper part and weathered from felsic to mafic, igneous and high-grade metamorphic rocks such as mica gneiss, hornblende gneiss, and amphibolite. Mean annual temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from about 35 to 65 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Brevard, Evard and the closely related Edneytown, and Pigeonroost series, these are Ashe, Chestnut, Cleveland, Clifton, Edneyville, Fannin, Hunt Dale, Plott, Porters, Rabun, Saluda, Trimont, Unaka, and Walhalla, and Watauga series. Edneytown and Pigeonroost soils are 7.5YR or browner. Additionally, Pigeonroost soils have a paralithic contact with weathered bedrock at 20 to 40 inches. Clifton soils have a fine particle size class. Ashe, Chestnut, Cleveland, Edneyville, Plott, Porters, and Unaka soils do not have an argillic horizon. Saluda soils have a paralithic contact with weathered bedrock at less than 20 inches. Fannin, and Watauga soils are in a paramicaceous mineralogy class. Rabun soils have argillic horizon with value 3 or less and are in a fine particle-size class. Saunook, Trimont, and Thunder soils have surface horizons with Humic features which are greater than or equal to 7 inches thick.. Hunt Dale, Plott, Porters, and Unaka have umbric epipedons. All these soils formed on ridges and side slopes except Brevard, Saunook, and Thunder soils which are on colluvial benches, toe slopes, and fans. Also, Hunt Dale, Plott, Porters, Trimont, and Unaka soils are on ridges and side slopes of cooler, north to east aspects.

DRAINAGE AND PERMEABILITY: Well drained; moderate permeability. Runoff class is low on gentle slopes, medium on strong or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Most of the soil is in forest. Common trees are chestnut oak, white oak, scarlet oak, black oak, and hickory with some eastern white pine, Virginia pine, pitch pine, and shortleaf pine. The understory includes flowering dogwood, American chestnut sprouts, sourwood, mountain laurel, flame azalea, blueberry, and buffalo nut. Cleared areas are used for pasture and hayland.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of North Carolina, South Carolina, Georgia, Tennessee, and Virginia. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Alexander County, North Carolina; 1988. The name is from the Cowee mountains in Macon County, North Carolina.

REMARKS: The Cowee series describes soils that are intermediate in depth to soft bedrock between the shallow Saluda and very deep Evard series. Formerly, they were included with these soils.

The 12/97 revision places the Cowee series in a fine-loamy, parasesquic, mesic Typic Hapludults family. The series was formerly in a mixed mineralogy family. CEC activity class placement is based on sample pedon S85-NC-099-003 and on similar soils such as Brevard and Evard.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 7 inches (Oi and A horizons).

Argillic horizon - the zone from 7 to 29 inches (Bt horizons).

Paralithic contact - the contact with weathered rock at 29 inches (upper boundary of the Cr horizon).

Parasesquic mineralogy class - total iron oxide, by weight (DCB Fe multiplied by 1.43) plus percent, by weight, gibbsite of more than 10 in the fine-earth fraction.

ADDITIONAL DATA:

MLRA: 130 SIR(s): NC0171, NC0241 (Stony)

Revised: 10/92-MLS,AG,CD; 1/98-DHK; 2/02-MKC

National Cooperative Soil Survey
U.S.A.

CULLASAJA

LOCATION CULLASAJA NC

Established Series
DJT-AG; Rev. MKC
03/2003

CULLASAJA SERIES

The Cullasaja series consists of very deep, well drained soils on benches, toe slopes, foot slopes, drainageways, and fans in coves in the Blue Ridge (MLRA 130). They formed in colluvium derived from materials weathered from felsic to mafic high-grade metamorphic and igneous rocks such as granite, mica gneiss, hornblende gneiss, and schist. Near the type location, mean annual air temperature is about 52 degrees F., and mean annual precipitation is about 70 inches. Slope ranges from 8 to 95 percent.

TAXONOMIC CLASS: Loamy-skeletal, isotic, mesic Humic Dystrudepts

TYPICAL PEDON: Typical pedon of Cullasaja cobbly sandy clay loam, on a 30 percent southeast facing toe slope at 3220 feet elevation - Forested. (Colors are for moist soil unless otherwise stated.)

Oi--0 to 2 inches; partially decomposed leaves, twigs, and roots.

A1--2 to 12 inches; very dark grayish brown (10YR 3/2) cobbly sandy clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; very friable; many fine and medium, and common coarse roots; 5 percent gravel, 10 percent cobbles, 5 percent stones by volume; few fine flakes of mica; very strongly acid; clear wavy boundary.

A2--12 to 19 inches; dark brown (10YR 3/3) cobbly sandy clay loam, dark yellowish brown (10YR 4/4) dry; moderate fine and medium granular structure; very friable; common fine to coarse roots; 5 percent gravel, 10 percent cobbles, 5 percent stones by volume; few fine flakes of mica; strongly acid; clear wavy boundary. (Combined thickness of the A horizon is 10 to 20 inches.)

Bw--19 to 34 inches; strong brown (7.5YR 4/6) cobbly fine sandy loam; weak fine and medium subangular blocky structure; very friable; common medium to coarse roots; 10 percent gravel, 10 percent cobbles, 20 percent stones; few fine flakes of mica; strongly acid; clear wavy boundary. (10 to 40 inches thick)

BC--34 to 67 inches; strong brown (7.5YR 4/6) cobbly loamy sand; weak fine and medium subangular blocky structure; very friable; few medium to coarse roots; 10 percent gravel, 15 percent cobbles, 30 percent stones; few fine to medium flakes of mica; moderately acid.

TYPE LOCATION: Macon County, North Carolina; approximately 3.0 miles west of Coweeta Hydrologic Station Office on the Shope Creek road; 40 feet upslope from hairpin curve; 500 feet east of weir on Watershed No. 36. USGS Prentiss topographic quadrangle; lat. 35 degrees 3 minutes 28 seconds N. and long. 83 degrees 27 minutes 53 seconds W., NAD 27. State plane coordinates are: 505,700N; 664,600E.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 30 to more than 60 inches. Depth to bedrock is greater than 60 inches. Reaction ranges from extremely acid to slightly acid in the A horizon. The Bw and lower horizons range from very strongly acid to moderately acid. Content of flakes of mica few or common. Rock fragment content ranges from 15 to 65 percent by volume in the A and upper B horizons. Average content of rock fragments is 35 to 80 percent by volume in the particle-size control section. The fragments range from gravel to boulders in size.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. Texture is sandy loam, fine sandy loam, loam or sandy clay loam in the fine-earth fraction.

The Bw horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 3 to 8. Some pedons have BA horizons that have hue value of 3 and chroma of 4. Texture is sandy loam, fine sandy loam, loam, or sandy clay loam in the fine-earth fraction.

The BC horizon, where present, has hue of 5YR to 10YR, value of 3 to 6, and chroma of 4 to 8. Texture is loam, sandy loam, coarse sandy loam, sandy clay loam, loamy fine sand, or loamy sand in the fine-earth fraction.

The C horizon, where present, is colluvium that is multicolored or similar in color to the BC horizon. Texture is loam, fine sandy loam, sandy loam, coarse sandy loam, loamy fine sand, loamy sand or loamy coarse sand in the fine-earth fraction.

COMPETING SERIES: These are the Brightwood, Harrington, Klickitat, Milbury, Spivey, Swedeheaven, and Wauld series. Brightwood, Harrington, Milbury, Swedeheaven, and Wauld soils are 20 to 40 inches deep to a lithic contact. Klickitat soils are 40 to 60 inches deep to a lithic contact, formed in colluvium weathered from basalt, and contain basalt fragments. Spivey soils formed in colluvium weathered from low-grade metasedimentary rocks such as phyllite, slate, and low-grade metasandstone and contain fragments of those rocks.

GEOGRAPHIC SETTING: Cullasaja soils are on benches, foot slopes, toe slopes, drainageways, and fans in coves in the Blue Ridge (MLRA 130). Elevation ranges from about 1,500 to 4,800 feet. Slopes are commonly 15 to 50 percent, but range from 8 to 95 percent. These soils formed in colluvium derived from materials weathered from felsic to mafic, high-grade metamorphic and igneous rocks such as granite, mica gneiss, hornblende gneiss, and schist. Climate is temperate and humid. Mean annual air temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from about 50 to 80 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Ashe, Cashiers, Chandler, Chestnut, Cleveland, Edneyville, Evard, Fannin, Haywood, Plott, Porters, Saluda, Saunook,

Sylva, Trimont, Tuckasegee, Tusquitee, and Whiteside soils. Ashe, Cashiers, Chandler, Chestnut, Cleveland, Edneyville, Evard, Fannin, Plott, Porters, Saluda, and Trimont soils formed in residuum with some soil creep in the upper part, have C horizons in saprolite, and are on locally higher mountain ridgetops and side slopes. Saunook soils also formed in colluvium, but they have argillic horizons and are fine-loamy. Haywood, Tuckasegee and Tusquitee soils formed in colluvium, but they are fine-loamy. Sylva and Whiteside soils are in nearly level and gently sloping colluvial positions. Sylva soils are poorly drained and Whiteside soils are moderately well drained.

DRAINAGE AND PERMEABILITY: Well drained, moderately rapid permeability. Runoff class is low on strongly sloping or moderately steep slopes, and medium on steeper slopes. Runoff is much lower where forest litter has little or no disturbance. Cullasaja soils receive moisture from surrounding uplands; therefore, springs and local seepage areas are common.

USE AND VEGETATION: Most of this soil is forested. Common trees are yellow poplar, black cherry, black birch, sugar maple, northern red oak, American basswood, eastern hemlock and yellow buckeye. At elevations above 4,000 feet yellow birch replaces yellow poplar as a common tree. Common understory plants include rhododendron, striped maple, red maple, serviceberry, Carolina silverbell, trillium, hay-scented fern, Solomon's seal, yellow mandarin, woodfern, and New York fern. Some of the less stony or bouldery areas are used for pasture, Christmas trees, and horticultural crops.

DISTRIBUTION AND EXTENT: North Carolina, and possibly Georgia, Tennessee, and Virginia. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: McDowell County, North Carolina, 1989. The name is from the Cullasaja River.

REMARKS: This series was previously included in the Spivey series. However, Spivey soils formed in colluvium derived from materials weathered from low-grade metasedimentary rocks such as phyllite, low-grade metasandstone, and slate and contain fragments of those rocks.

This 12/97 revision adjusts the textures of the A1, A2 and Bw horizons based on laboratory data for this pedon and places Cullasaja soils in an isotic mineralogy class. Although Cullasaja soils may exhibit some of the characteristics of andic soil properties, they lack the volcanic glass found in soils of similar taxa in the Western United States.

Diagnostic horizons and other features recognized in this pedon:

Umbric Epipedon - the zone from the mineral soil surface to a depth of 19 inches (A1 and A2 horizons).

Cambic Horizon - 19 to 67 inches (Bw and BC horizons).

Isotopic mineralogy class - within the PSCS the soil generally has high amorphous materials (high pH-dependent charge) and a high moisture retention (at 1500 kPa) to clay ratio.

Skeletal property - average content of more than 35 percent rock fragments, by volume, in the control section. (A2, Bw and BC horizons).

ADDITIONAL DATA: Characterization data is available from the National Soil Survey Laboratory, Lincoln, NE for the following pedons: S86NC-113-023 and S91NC-171-003.

MLRA: 130 SIR(s): NC0237, NC0238 (Bouldery)

NASIS Data Map Unit ID: NASIS data for the typical pedon in Macon County, NC are represented by DMU #368257.

Revised: 10/92-DJT,AG; 12/97-DHK, 3/03-MKC

National Cooperative Soil Survey
U.S.A.

EVARD

LOCATION EVARD

SC+GA NC TN VA

Established Series

ECH-DJD; Rev. MKC

02/2002

EVARD SERIES

The Evard series consists of very deep, well drained, moderately permeable soils on ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum affected by soil creep in the upper part and weathered from felsic to mafic, igneous and high-grade metamorphic rocks. Slopes range from 2 to 95 percent.

TAXONOMIC CLASS: Fine-loamy, parasesquic, mesic Typic Hapludults

TYPICAL PEDON: Evard sandy loam - forested. (Colors are for moist soil.)

A--0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam, weak fine granular structure; very friable; nonsticky, nonplastic; many fine and few medium roots; strongly acid; abrupt smooth boundary. (2 to 7 inches thick)

E--2 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and few medium roots; very strongly acid; abrupt smooth boundary. (0 to 6 inches thick)

Bt1--5 to 9 inches; strong brown (7.5YR 5/8) fine sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and few medium roots; few distinct clay films on faces of some peds; very strongly acid; clear wavy boundary.

Bt2--9 to 29 inches; red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and few medium roots; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary. (Combined thickness of the Bt horizon is 12 to 28 inches.)

BC--29 to 37 inches; red (2.5YR 5/8) very fine sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few pebbles of quartz at top of horizon; strongly acid; gradual wavy boundary. (0 to 17 inches thick)

C1--37 to 49 inches; yellowish red (5YR 4/6) saprolite that has a texture of very fine sandy loam; massive; very friable, few fine roots; common very fine flakes of mica;; strongly acid; clear smooth boundary.

C2--49 to 72 inches; reddish brown (5YR 5/4) saprolite that has a texture of loamy fine sand; common coarse distinct yellowish red (5YR 5/8) and few medium prominent black (5YR 2.5/1) mottles; massive; very friable; few fine roots; common very fine flakes of mica; very strongly acid.

TYPE LOCATION: Oconee County, South Carolina; 3.5 miles south of Stumphouse Ranger Station and 5.2 miles southeast of Whitstone; from junction of Stumphouse Road (South Carolina Secondary Road 290) and Rich Mountain Road (USFS 744) go 3.0 miles generally south on Rich Mountain Road, then at 320 degrees north from center of road go 425 feet.

RANGE IN CHARACTERISTICS: Thickness of the argillic horizon ranges from 12 to 28 inches. Solum thickness ranges from 20 to more than 40 inches. Depth to weathered bedrock is more than 60 inches. The A and E horizons are extremely acid to moderately acid except where surface layers have been limed, and the B and C horizons are very strongly acid or strongly acid. Content of flakes of mica is few or common throughout. The content of rock fragments ranges from 0 to 35 percent throughout

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. Where value is 3, this horizon is less than 7 inches thick. It is sandy loam, fine sandy loam, or loam, in the fine-earth fraction.

The E horizon, where present, has hue of 5YR to 10YR, value of 4 to 6, chroma of 3 to 8. It is sandy loam, fine sandy loam, loam, in the fine-earth fraction.

The BA or BE horizon, where present, has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam. In pedons that do not have a BA horizon, the upper part of the Bt horizon has the colors and textures described for the BA horizon.

The Bt horizon in pedons with a BA horizon and the lower part of the Bt horizon in pedons without a BA horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, loam, or clay loam.

The BC horizon, where present, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 or 8. Non-redoximorphic mottles in shades of red, brown, or yellow are in some pedons. It is sandy loam, fine sandy loam, very fine sandy loam, loam, sandy clay loam, or clay loam.

The C horizon is multicolored, or has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8, commonly with non-redoximorphic mottles in shades of red, brown, or yellow. Gray or black mottles of relic rock material are in some pedons. It is saprolite that has a texture of sandy loam, fine sandy loam, very fine sandy loam, loam, loamy fine sand, or loamy sand.

COMPETING SERIES: These are the Brevard, Cowee, Stott Knob (T), and Walhalla series. Brevard soils formed in colluvium or old alluvium on high stream terraces, and colluvial benches, toe slopes, and fans.. Cowee, and Stott Knob soils are have a paralithic contact with

weathered bedrock at 20 to 40 inches. Brevard and Walhalla soils have argillic horizons thicker than 28 inches.

GEOGRAPHIC SETTING: Evard soils are on gently sloping to very steep ridges and side slopes of low and intermediate mountains of the Blue Ridge (MLRA 130). Elevations are dominantly 1,400 to 4,000 feet. Slopes are typically between 15 and 50 percent but range from 2 to 95 percent. Evard soils formed in residuum that is affected by soil creep in the upper part, and weathered from felsic to mafic, igneous and high-grade metamorphic rocks such as mica gneiss, hornblende gneiss, and amphibolite. Precipitation ranges from 35 to 80 inches per year. The mean annual air temperature ranges from 46 to 57 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Brevard, Cowee, and the closely related Edneytown, and Pigeonroost series, these are Ashe, Chestnut, Cleveland, Clifton, Edneyville, Fannin, Hunt Dale, Plott, Porters, Rabun, Saluda, Thunder, Trimont, Unaka, Walhalla, and Watauga series. Edneytown and Pigeonroost soils are 7.5YR or browner. Additionally, Pigeonroost soils have a paralithic contact with weathered bedrock at 20 to 40 inches. Clifton soils have a fine particle size class. Ashe, Chestnut, Cleveland, Edneyville, Plott, Porters, and Unaka soils do not have an argillic horizon. Fannin, and Watauga soils are in a micaceous and paramicaceous mineralogy class, respectively. Saluda soils have a paralithic contact with weathered bedrock at less than 20 inches. Rabun soils have argillic horizon with value 3 or less and are in a fine particle-size class. Saunook, Trimont, and Thunder soils have surface horizons with Humic features which are greater than or equal to 7 inches thick. Hunt Dale, Plott, Porters, and Unaka have umbric epipedons. All these soils formed on ridges and side slopes except Brevard, Saunook, and Thunder soils which are on colluvial benches, toe slopes, and fans. Also, Hunt Dale, Plott, Porters, Trimont, and Unaka soils are on the ridges and side slopes of cooler, north to east aspects.

DRAINAGE AND PERMEABILITY: Well drained; permeability is moderate in the subsoil and moderately rapid in the underlying material. Runoff class is low on gentle slopes, medium on strong or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Most of the soil is in forest. Common trees are chestnut oak, white oak, scarlet oak, black oak, and hickory with some eastern white pine, Virginia pine, pitch pine, and shortleaf pine. The understory includes flowering dogwood, American chestnut sprouts, sourwood, mountain laurel, flame azalea, blueberry, and buffalo nut. Cleared areas are commonly used for pasture and hayland and occasionally burley tobacco.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of South Carolina, North Carolina, Tennessee, Georgia, and Virginia. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Greenville County, South Carolina, 1972.

REMARKS: The 1/98 revision places the Evard series in a parasesquic mineralogy family. It was formerly in an oxidic family.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface of the soil to 5 inches (A and E horizons)

Argillic horizon - the zone from 5 to 29 inches (Bt1 and Bt2 horizons)

Parasesquic mineralogy class - total iron oxide, by weight (DCB Fe multiplied by 1.43) plus percent, by weight, gibbsite of more than 10 in the fine-earth fraction.

ADDITIONAL DATA: Particle-size and chemical analysis is on file for this pedon.

MLRA: 130 SIR(s): SC0083, SC0135 (GRAVELLY)

Revised: 11/92-ECH,DJD; 9/96-BPS,DHK; 1/98-DHK; 2/02-MKC

National Cooperative Soil Survey
U.S.A.

FRENCH

LOCATION FRENCH

NC+GA VA

Established Series

Rev. CD:RM:RAG

01/2002

FRENCH SERIES

The French series consists of very deep, moderately well to somewhat poorly drained, moderately over rapidly permeable soils with contrasting textures on the flood plains of small streams in the southern Appalachian and Blue Ridge Mountains. They formed in recent alluvial sediments. Slopes are 0 to 5 percent.

TAXONOMIC CLASS: Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Fluvaquentic Dystrudepts

TYPICAL PEDON: French loam--cultivated field. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 12 inches; dark brown (10YR 4/3) loam; weak medium granular structure; friable; common fine roots; few fine flakes of mica; few fine pebbles, slightly acid; abrupt smooth boundary. (8 to 14 inches thick)

Bw1--12 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; few medium faint dark grayish brown (10YR 4/2) and dark reddish brown (2.5YR 3/4) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine and medium pores; common fine flakes of mica; medium acid; clear smooth boundary. (4 to 8 inches thick)

Bw2--20 to 30 inches; dark yellowish brown (10YR 4/4) loam; many coarse distinct grayish brown (10YR 5/2) mottles and few fine distinct dark reddish brown (2.5YR 3/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; common fine flakes of mica; medium acid; clear smooth boundary. (8 to 17 inches thick)

C--30 to 34 inches; yellowish brown (10YR 5/6) very gravelly loamy sand, common medium distinct dark reddish brown (2.5YR 3/4) mottles; single grained; very friable; common fine flakes of mica; slightly acid; abrupt broken boundary.

Cg--34 to 60 inches; grayish brown (10YR 5/2) extremely gravelly sand; single grained; loose; few cobbles; few flakes of mica; medium acid.

TYPE LOCATION: Madison County, North Carolina; 3 miles southwest of Mars Hill on SR 1559, 200 feet north of SR 1559 and 100 feet east of Gabriel Creek. (766,850X; 944,535Y)

RANGE IN CHARACTERISTICS: Solum thickness and depth to horizons of stratified sand and gravel that contain more than 35 percent by volume rock fragments ranges from 20 to 40 inches. Content of coarse rock in the A and B horizons ranges from 0 to 15 percent. Some part of the C horizon within a depth of 40 inches contains more than 35 percent rock fragments. Depth to bedrock is greater than 60 inches. The soil ranges from slightly acid to very strongly acid throughout except where surface layers have been limed. Flakes of mica ranges from few to common throughout the solum.

The A or Ap horizons have hue of 7.5YR and 10YR, value of 3 to 5, and chroma of 1 to 4. It is loam, sandy loam, or fine sandy loam.

The BA horizon, where present, has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 8 with few to common mottles in shades of gray and brown. It is fine sandy loam, sandy clay loam, or loam.

The Bw horizon has hue of 7.5YR and 10YR, value of 4 to 6, and chroma of 3 to 8 with few to many mottles in shades of gray, red, and brown. It is loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam.

The C horizon is similar in color to the Bw horizon and contains common to many mottles and streaks in shades of gray, brown, or red. It is loamy sand, sandy loam, or loam in the fine-earth fraction. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less. It is loamy sand, coarse sand, loamy coarse sand, or sand in the fine-earth fraction. Thin horizons of finer texture are in some pedons. Depth to C or Cg horizons that contain more than 35 percent rock fragments of gravel and cobble size is 20 to 40 inches.

COMPETING SERIES: There are no other known series in this family. Those in closely related families are Chewacla, Codorus, Colvard, Comus, Craigsville, Cullowhee, Reddies, and Rowland series. All of these soils, except Cullowhee and Reddies, lack contrasting textures within 1 meter. In addition, Chewacla soils are thermic, Comus soils have better drainage, and Craigsville soils are loamy-skeletal. Cullowhee and Reddies soils have an umbric epipedon.

GEOGRAPHIC SETTING: French soils are on flood plains of small streams of the southern Appalachian and Blue Ridge Mountains. Slopes are 0 to 5 percent. They formed in recent loamy alluvial sediments washed largely from soils weathered from gneiss, schist, phyllite, and other crystalline rocks. The mean annual temperature is 55 degrees F. and the mean annual precipitation is 50 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Codorus and Comus series, and the Arkaqua, Biltmore, Delanco, Hatboro, Iotla, Nikwasi, and Suncook series. Except for Nikwasi soils, these soils lack contrasting textures within 40 inches. and in addition, Delanco soils have argillic horizons. Biltmore and Suncook soils are sandy. Iotla and Hatboro soils have poorer drainage.

DRAINAGE AND PERMEABILITY: Moderately to somewhat poorly drained; runoff is slow and permeability is moderate in the solum and rapid in the stratified sand and gravel. A seasonal

high water table fluctuates between 1 and 2 1/2 feet below the surface for about 5 months in most years. This soil is flooded for very brief duration mainly in late winter and spring.

USE AND VEGETATION: About 80 percent of the acreage is cleared and used for pasture or cropland. The remainder is in woods. Wooded areas are mainly mixed hardwoods that include yellow-poplar, northern red oak, sycamore, black walnut, red maple, and hickories. Important crops grown are corn, tobacco, small grain, and vegetable crops.

DISTRIBUTION AND EXTENT: Blue Ridge and Southern Appalachian Mountains of North Carolina, Georgia, and Virginia. The series is of small extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Madison County, North Carolina; 1980. Established by prior correlation.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 12 inches (Ap horizon).

Cambic horizon - the zone from 12 to 30 inches (Bw horizon).

Strongly contrasting particle-size classes - the occurrence of the fine-loamy particle-size class over the sandy-skeletal particle-size class at 30 inches.

National Cooperative Soil Survey
U.S.A.

IOTLA

LOCATION IOTLA NC

Established Series
Rev. MAB-DLN-DHK-MKC
04/2001

IOTLA SERIES

The Iotla series consists of very deep, somewhat poorly drained soils with moderately rapid permeability on flood plains in the southern Appalachian Mountains. They formed in loamy, recent alluvium. The mean annual temperature is 56 degrees F. and the average annual rainfall is 39 inches near the type location. Slope ranges from 0 to 3 percent.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

TYPICAL PEDON: Iotla loam in a flood plain--corn field. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 10 inches; brown (7.5YR 4/4) loam; moderate medium and coarse granular structure; very friable; many medium and fine roots; common fine and medium flakes of mica; moderately acid; clear smooth boundary. (6 to 12 inches thick)

Bw--10 to 31 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; very friable; few fine distinct reddish yellow (7.5YR 6/6) masses of iron accumulation and few fine distinct dark grayish brown (10YR 4/2) iron depletions; common fine and medium flakes of mica; moderately acid; clear wavy boundary. (9 to 30 inches thick)

2C1--31 to 35 inches; reddish yellow (7.5YR 6/6) and brown (7.5YR 4/4) loamy sand; massive; loose; 2 percent gravel; many fine and medium flakes of mica; strongly acid; abrupt wavy boundary. (4 to 8 inches thick)

3C2--35 to 60 inches; brown (10YR 4/3) loam; massive; very friable; common medium distinct reddish brown (5YR 4/4) masses of iron accumulation and common medium distinct dark grayish brown (10YR 4/2) iron depletions; common fine and medium flakes of mica; moderately acid.

TYPE LOCATION: Buncombe County, North Carolina on Cane Creek flood plain 600 feet east of intersection of Cane Creek Road and Mills Gap Road. The exact location is about 500 feet northwest of Cane Creek in field (627,136X; 946,134Y); USGS Fruitland topographic quadrangle, lat. 35 degrees, 26 minutes, 36 seconds N., and long. 82 degrees, 29 minutes, 16 seconds W., NAD 27 (estimated by description).

RANGE IN CHARACTERISTICS: The loamy sediments range from 40 to 60 inches or more in thickness over deposits of cobbles and gravel that are stratified with sandy and loamy materials. Rock fragments range from 0 to 10 percent by volume in the 10 to 40 inch textural control section. Flakes of mica range from common to many throughout the soil. Soil reaction ranges from strongly acid to slightly acid in the upper 30 inches where unlimed, and from strongly acid to neutral below 30 inches.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4. Where the value is 3 and chroma is 1 to 3, the horizon is less than 6 inches thick. It is fine sandy loam, sandy loam, or loam. In some pedons, the surface soil is scoured and covered by thin deposits of sandy material. Many pedons have an Ab horizon which has the same color and texture range as the A horizon.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 6. Redox depletions of chroma 2 or less, indicative of seasonal saturation, are few to common throughout the Bw horizon. It is loam, fine sandy loam, or sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 6. Redox depletions of chroma 2 or less, indicative of seasonal saturation, are few to common throughout most of the C horizon. Below 20 inches, some pedons have a Cg horizon that has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 0 to 2. Texture to a depth of 40 inches in the C horizon, and Cg horizon where present, is loam, fine sandy loam, or sandy loam. These horizons can be nearly homogenous or stratified with these textures. In some pedons bands with sandy textures less than 5 inches thick occur within the loamy matrix. The C and Cg horizons below 40 inches are typically loamy in texture, but may be stratified with sand and gravelly sand. Some layers contain cobbles and a few stones.

COMPETING SERIES: Bash, Basher, Philo and Pootatuck soils are the only competing series in this family. The Bash series allows siltier textures in the solum and formed in alluvium derived from sandstone, shale and siltstone. Basher, Philo and Pootatuck soils do not have redox depletions in the upper part of the Bw horizon (are moderately well drained). Basher and Philo soils also formed in alluvium derived from sedimentary rocks. Pootatuck soils have loamy fine sand to coarse sand within 40 inches. Soils in closely related families are the Arkaqua, Codorus, Cullowhee, and French series. Arkaqua and Codorus soils are fine-loamy. Cullowhee soils are in a coarse-loamy over sandy or sandy-skeletal family and have an umbric epipedon. French soils are in a fine-loamy over sandy or sandy-skeletal family.

Note: Competing series were updated to pre-7th Edition of Keys to Soil Taxonomy standards since many of these may be reclassified to families different than Iotla using the latest edition.

GEOGRAPHIC SETTING: Iotla soils are on flood plains of valleys in the Southern Appalachian Mountains. Slope ranges from 0 to 3 percent. They formed in loamy recent alluvium. The mean annual soil temperature is 56 degrees F. and the average annual rainfall is 39 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the French series, these are Braddock, Brevard, Colvard, Elsinboro, Rosman, Tate, Toxaway, and Tusquitee series. Braddock, Dillard, and Elsinboro soils are on stream terraces and have an argillic horizon. In addition, Braddock and Elsinboro soils are well drained, and Dillard soils are moderately well drained. Brevard, Tate, and Tusquitee soils are on colluvial fans, benches, and foot slopes and are well drained. Also, Brevard and Tate soils have an argillic horizon, and Tusquitee soils have a cambic horizon. Colvard and Rosman soils are well or moderately well drained and are on slightly higher parts of flood plains. French soils are in the same position on flood plains as Iotla soils. Toxaway soils are very poorly drained and are in low, wet parts of flood plains.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained; moderately rapid permeability. Runoff class is negligible where nearly level and very low on gentle slopes. Flooding is common.

USE AND VEGETATION: Much of the acreage is cleared and used for crops and native pasture. Important crops are corn for grain and silage, vegetables and fescue pasture. Native forest species include yellow-poplar, eastern white pine, northern red oak, white oak, black oak, American sycamore, black walnut, white ash, river birch, American beech, black locust, basswood, and hemlock. A dense growth of rhododendron forms the understory in many places.

DISTRIBUTION AND EXTENT: Flood plains of the Southern Appalachian Mountains of North Carolina and possibly Georgia, South Carolina, Tennessee, and Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Buncombe County, North Carolina; 1982.

REMARKS: The Iotla series would confine similar soils of Codorus series to regions other than MLRA 130. Soils correlated Codorus within MLRA 130 are surrounded by this series.

The 12/97 revision places the Iotla series in the coarse-loamy, mixed, active, mesic Fluvaquent Dystrochrepts family per the 7th Edition of the Keys to Soil Taxonomy. Iotla soils were formerly classified as coarse-loamy, mixed, nonacid, mesic Aquic Udifluvents. The OSD indicates a cambic horizon although on narrower floodplains Udifluvents often occur within Iotla map units. The dominant situation is a wider floodplain where a cambic horizon has developed. CEC activity class placement was based on placement of similar soils. The 2/99 revision updates the classification to the 8th Edition of Keys to Soil Taxonomy.

Diagnostic horizons and feature recognized in this pedon are:

Ochric epipedon - the zone from the surface to 10 inches (Ap horizon)

Cambic horizon - the zone from 10 to 31 inches below the surface (Bw horizon)

Fluvaquentic feature - an irregular decrease in organic carbon from a depth of 10 inches to a depth of 50 inches below the surface; redox depletions within 24 inches from the soil surface; and a slope of less than 25 percent.

MLRA: 130

SIR(s): NC0140

Revised: 10/89-MAB,DLN,RAG; 1/98-DHK; 2/99-MKC

National Cooperative Soil Survey
U.S.A.

NIKWASI

LOCATION NIKWASI NC

Established Series
DJT; Rev. MKC
06/2003

NIKWASI SERIES

The Nikwasi series consists of poorly drained and very poorly drained, moderately rapidly permeable soils on flood plains in the Blue Ridge (MLRA 130). These soils formed in recent alluvium consisting of loamy material that is moderately deep to strata of sand, gravel, and/or cobbles. Near the type location, mean annual temperature is 55 degrees F., and mean annual precipitation is 70 inches. Slope ranges from 0 to 3 percent.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, mesic Cumulic Humaquepts

TYPICAL PEDON: Nikwasi fine sandy loam on a 1 percent slope in a flood plain--hay field. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 8 inches, very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; very friable; common fine roots; few rounded gravel; common fine and medium flakes of mica; slightly acid; clear wavy boundary.

A--8 to 26 inches, very dark gray (10YR 3/1) fine sandy loam, dark gray (10YR 4/1) dry; weak medium granular structure; very friable; common fine roots; few rounded gravel; common fine and medium flakes of mica; slightly acid; clear smooth boundary. (Combined thickness of the A subhorizons is 24 to 35 inches.)

Cg--26 to 60 inches, dark grayish brown (10YR 4/2) and multicolored extremely gravelly coarse sand; single grained; loose; dominantly waterworn gravel with many cobbles; common fine and medium flakes of mica; moderately acid.

TYPE LOCATION: Jackson County, North Carolina; 6 miles northeast of Sylva on US 19-23; 2000 feet northeast of Mt. Pleasant Church; 75 feet east of Scotts Creek in a hay field.

RANGE IN CHARACTERISTICS: Depth to sandy C horizons that contain more than 35 percent by volume gravel and/or cobbles is 24 to 40 inches. Depth to bedrock is more than 5 feet. Gravel and/or cobbles are in the A and AC horizons of some pedons, but comprise less than 35 percent. Coarse-loamy horizons that overlie sandy or sandy-skeletal horizons average less than 50 percent fine and coarser sand. Content of mica flakes is none to many. Reaction is very strongly acid to slightly acid, but some part of the control section is moderately acid or slightly acid.

The A horizon has hue of 2.5Y or 10YR, value of 2 or 3, and chroma of 1 to 3; or it is neutral and has value of 2 or 3. It is fine sandy loam, sandy loam, or loam in the fine earth fraction. In some pedons, there is a thin surface layer of sandy or loamy, lighter colored recent overwash.

The AC horizon, where present, has colors similar to the A horizon. It is loamy sand, loamy fine sand, loamy coarse sand, sand, or coarse sand in the fine earth fraction.

The Cg horizon is has hue of 2.5Y to 10YR, value of 4 to 7, and chroma of 1 to 2; or it is neutral and has value of 4 to 7. Also, individual grains and coarse fragments may be multicolored. It is loamy sand, loamy coarse sand, loamy fine sand, sand, or coarse sand in the fine-earth fraction.

COMPETING SERIES: There are no other known series in this family. Series in closely related families are the Cullowhee, Deckerville, Ela (T), French, Koch, Odas, and Toxaway series. Cullowhee soils have an umbric epipedon less than 24 inches thick and are somewhat poorly drained. Deckerville and French soils are in a fine-loamy over sandy or sandy- skeletal family. Also, French soils have an ochric epipedon and are somewhat poorly drained. Ela soils have an umbric epipedon less than 24 inches thick. Koch and Odas soils have a regular decrease in organic matter content with depth. Toxaway soils are in a fine-loamy, nonacid family and lack Cg horizons with more than 35 percent coarse fragments within a 40 inch depth.

GEOGRAPHIC SETTING: Nikwasi soils are on nearly level, relatively narrow flood plains in the upper reaches of watersheds in the Blue Ridge (MLRA 130). Slope ranges from 0 to 3 percent. These soils formed in recent alluvium consisting of loamy material that is moderately deep to strata of sand, gravel, and/or cobbles. Near the type location, mean annual temperature is about 55 degrees F., and mean annual precipitation is about 70 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Cullowhee and French soils, and the Craigsville, Cullasaja, Dellwood, Potomac, Reddies, Smokemont (T), Sylva, Tusquitee, and Whiteside soils. All of these soils except Sylva and Toxaway are better drained than Nikwasi. Craigsville, Dellwood, Potomac, Reddies, and Smokemont soils are on flood plains generally nearer to the stream channel than Nikwasi. Cullasaja, Tusquitee, Sylva, and Whiteside soils formed in colluvium on toe slopes and fans.

DRAINAGE AND PERMEABILITY: Poorly and very poorly drained; very slow to ponded runoff; moderately rapid permeability in the A horizon and rapid in the C horizons.

USE AND VEGETATION: Much of this soil is in idle open land that was cleared for cropland but abandoned because of wetness and flooding. These areas are commonly in alders, sedges, rushes, and weeds. Some areas are used for pasture and hay. Common trees in forested areas are yellow poplar, sycamore, red maple, and yellow birch. A few areas have been planted to eastern white pine.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of North Carolina, Georgia, and possibly Tennessee and Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Jackson County, North Carolina, 1990. The name is the Cherokee Indian name for Franklin, North Carolina in adjacent Macon County, North Carolina.

REMARKS: The soils now placed in the Nikwasi series were previously included in the Toxaway series. However, Toxaway lacks a Cg horizon that contains more than 35 percent coarse fragments within 40 inches below the surface. The 2/99 revision updates classification to the 8th Edition of Keys to Soil Taxonomy. This soil is placed in the superactive CEC family based on data from pedon sample S86NC-113-024.

Diagnostic horizons and features in this pedon are:

Umbric Epipedon - The zone from the surface of the soil to a depth of 26 inches (Ap and A horizons)

Cumulic Humaquepts feature - An umbric epipedon 24 inches or more thick and irregular decrease in organic matter content with depth.

Nonacid family - reaction of 5.5 or more in the 10 to 40 inch control section.

Sandy-skeletal material between the depths of 26 and 60 inches (the Cg horizon).

Revised: 2/99, 6/03-MKC

National Cooperative Soil Survey
U.S.A.

PORTERS

LOCATION PORTERS

NC+GA SC TN VA

Established Series

Rev. DLN-HJB-AG-DHK

04/2001

PORTERS SERIES

The Porters series consists of deep, well drained, moderately permeable soils on ridges and side slopes in the Southern Appalachian Mountains. These soils formed in residuum, affected by soil creep in the upper part, that has weathered from felsic to mafic, high-grade metamorphic and igneous rocks such as granite, gneiss, hornblende gneiss, mica gneiss, schist, and amphibolite. Near the type location, the mean annual air temperature is about 52 degrees F., and the mean annual precipitation is about 52 inches. Slope ranges from 6 to 95 percent.

TAXONOMIC CLASS: Fine-loamy, isotic, mesic Typic Dystrudepts

TYPICAL PEDON: Porters loam--pasture. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 7 inches; very dark grayish brown (10YR 3/2) loam; moderate fine and medium granular structure; very friable; many fine roots; few fine mica flakes; slightly acid; gradual smooth boundary. (7 to 10 inches thick)

BA--7 to 10 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; few mica flakes; few medium gneiss and quartz fragments; moderately acid; gradual smooth boundary. (0 to 6 inches thick)

Bw--10 to 22 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine mica flakes; few medium fragments of quartz and partly weathered rock; slightly acid; gradual smooth boundary. (10 to 30 inches thick)

BC--22 to 28 inches; brown (7.5YR 4/4) loam; very weak medium and coarse subangular blocky structure; friable; common medium fragments of quartz and partly weathered rock; few fine mica flakes; slightly acid; diffuse wavy boundary. (0 to 16 inches thick)

C--28 to 42 inches; mottled brown (10YR 4/3) and grayish brown (10YR 5/2) sandy loam; gneiss saprolite with quartz, weathered feldspar, hornblende, mica and other minerals; massive; friable; slightly acid; grades into hard rock.

R--42 inches; dark colored gneiss bedrock.

TYPE LOCATION: Alleghany County, North Carolina; 5 miles northeast of Laurel Springs; 1 mile south of Prathers Creek Church; 300 yards east of County Road 1149.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 20 to 50 inches. Depth to hard bedrock is 40 to 60 inches. Reaction is very strongly to slightly acid. Content of rock fragments commonly ranges from 0 to 15 percent by may range up to 35 percent. Fragments are of gravel, cobble, and stone size. Flakes of mica range from few to common in the A and B horizons, and from few to many in the C horizon.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 4. Thin A2 or AB horizons are present in some pedons. They have hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. Texture is fine sandy loam, sandy loam, loam, and sandy clay loam in the fine earth fraction.

The BA horizon, where present, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam, sandy loam, loam, or sandy clay loam in the fine earth fraction.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Texture is fine sandy loam, sandy loam, loam, or sandy clay loam in the fine earth fraction.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. Mottles in shades of brown, yellow, or gray range from none to common. Texture is fine sandy loam, sandy loam, loam, or sandy clay loam in the fine earth fraction.

The C horizon is saprolite that is variable in color. It is commonly multicolored or mottled, but in the upper part it may be similar in color to the BC horizon. Texture is fine sandy loam, sandy loam, loam, loamy sand, or loamy fine sand in the fine earth fraction.

Some pedons have a thin Cr horizon of soft, weathered bedrock below 40 inches that grades into hard bedrock within depths of 40 to 60 inches.

The R horizon is hard felsic to mafic, high-grade metamorphic or igneous rock such as granite, gneiss, hornblende gneiss, mica gneiss, schist, and amphibolite.

COMPETING SERIES: These are Brookshire, Jeffrey, Tusquitee, and Unaka series in the same family. Brookshire and Tusquitee soils formed in colluvium and are greater than 72 inches to bedrock. Jeffrey and Unaka soils have hard bedrock at 20 to 40 inches.

Note: Competing series have not been updated since most of these will also require reclassification using the 7th Edition of Keys to Soil Taxonomy (1996)

GEOGRAPHIC SETTING: Porters soils are on north and east facing strongly sloping to very steep ridges and side slopes of the Southern Appalachian Mountains. Elevation ranges from about 3,000 feet to 4,800 feet. Slopes are generally between 20 to 45 percent but range from 6 to 95 percent. Porters soils formed in residuum, affected by soil creep in the upper part, weathered from felsic to mafic, high-grade metamorphic or igneous rocks such as granite, gneiss, hornblende gneiss, mica gneiss, schist, and amphibolite. Mean annual temperature is 52 degrees F., and mean annual precipitation is 52 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Tusquitee and Unaka series, these are Burton, Cashiers, Chandler, Chestnut, Cowee, Craggey, Cullasaja, Edneyville, Evard, Haywood, Plott, Saluda, Saunook, Trimont, Tuckasegee, Watauga, and Wayah series. Burton, Craggey, and Wayah soils are in a frigid family and are at higher elevations. In addition, Burton is moderately deep and Craggey is shallow to bedrock. Cashiers soils are in a micaceous family and are in the same landscape position as Porters soils. Chandler, Chestnut and Edneyville soils have lighter colored or thinner ochric epipedons and are on warmer and drier parts of the landscapes, typically on south to west aspects. Also, Chandler soils are in a micaceous family. Cowee, Evard, Saluda, and Watauga soils have an argillic horizon and are at locally lower elevations or on warmer slopes, typically south to west aspects. Cullasaja, Haywood, Saunook, Tuckasegee, and Tusquitee soils formed in colluvium, are very deep, have C horizons of colluvial material, and are in coves and on toe slopes at locally lower elevations. Plott soils are very deep to bedrock and have an umbric epipedon 10 to 20 inches thick. Trimont soils have an argillic horizon, are in a fine-loamy family, and are at locally lower elevations on cool aspect slopes. Unaka soils are in the same landscape position as Porters soil.

DRAINAGE AND PERMEABILITY: Well drained, moderate permeability. Runoff class is medium on strongly sloping or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Most areas are in forest consisting of a dominant forest type of northern red oak with hickory, sugar maple, yellow-poplar, black locust, hemlock, and eastern white pine as associated. On dry sites or the higher elevations upland oaks, hickory, blackgum, red maple, yellow birch, black birch, and pitch pine are associated. Flowering dogwood, mountain laurel, and rhododendron are the dominant understory species. Approximately 20 percent of the soil is cleared and used for pasture, hay, corn, truck crops, burley tobacco and Christmas trees.

DISTRIBUTION AND EXTENT: The Southern Appalachian Mountains of Northern Georgia, North Carolina, South Carolina, eastern Tennessee, and Virginia. The series is extensive.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Bedford County, Virginia; 1901.

REMARKS: Porters soils were formerly classified as Gray-Brown Podzolic soils intergrading to Lithosols. The 9/89 revision restricts depth to bedrock to 40 to 60 inches. The Plott series was previously included with Porters soils. Plott soils are deeper than 60 inches to bedrock and have an umbric epipedon 10 to 20 inches thick.

The 1/97 revision placed Porters soils in a fine-loamy family. This series was formerly placed in a coarse-loamy family. Laboratory PSA (pipette method) and corresponding field texture estimates (feel method) indicate control section clay contents of generally 12 to 24 percent, with most pedons marginally coarse-loamy. However, chemical lab data indicate that sufficient amorphous, clay-sized materials occur in the particle-size control section to place this soil in a fine-loamy family. Average clay contents are generally less than 25 percent.

Additionally, textures were also modified in the range in characteristics for horizons within the solum.

This latest revision places Porters soils in an isotic mineralogy class. Using the 7th Edition of Keys to Soil Taxonomy (1996), Porters soils would classify as fine-loamy, isotic, mesic Andic Dystrochrepts. However, a proposal has been made to add an acid oxalate-extractable silicon requirement to Andic subgroups, which would exclude Balsam soils, which lack volcanic glass.

Diagnostic horizons and features in this pedon are:

Ochric epipedon - 0 to 7 inches (Ap horizon)

Umbric Dystrochrept feature - Moist value of 3 in the 0 to 7 inch Ap horizon.

Cambic horizon - 10 to 28 inches (Bw and BC horizons)

Lithic contact - hard bedrock at a depth of 42 inches.

Isotc mineralogy class - within the PSCS the soil generally has high amorphous materials (high pH-dependent charge) and a high moisture retention (at 1500 kPa) to clay ratio.

Properties that would place the soil in an Andic subgroup--a horizon or horizons with total thickness of 7 inches (18 cm) or more within 30 inches (75 cm) of the mineral soil surface with a fine-earth bulk density of 1.0 g/cm³ or less (at 33 kPa water retention) and ammonium oxalate extractable aluminum plus 1/2 iron percentages totaling more than 1.0.

MLRA: 130 SIR(s): NC0022, NC0152 (Stony)

Revised: 10/92-DLN,HJB,AG; 1/97-DHK, 12/97-DHK

National Cooperative Soil Survey
U.S.A.

REDDIES

LOCATION REDDIES

NC

Established Series

JMO-RCK; Rev. MKC

04/2003

REDDIES SERIES

The Reddies series consists of moderately well drained, moderately rapidly permeable soils on flood plains in the Blue Ridge (MLRA 130). They formed in recent alluvium that is loamy in the upper part and is moderately deep to sandy strata containing more than 35 percent by volume gravel and/or cobbles. Slope ranges from 0 to 3 percent. Near the type location, mean annual temperature is 56 degrees F. and mean annual precipitation is 49 inches.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Reddies fine sandy loam on a 1 percent slope in a cultivated field. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam; grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine roots; 5 percent rounded gravel by volume; common fine flakes of mica; neutral; clear smooth boundary. (10 to 20 inches thick)

Bw--14 to 26 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; common fine and medium flakes of mica; slightly acid; clear irregular boundary. (10 to 30 inches thick)

C1--26 to 41 inches; dark yellowish brown (10YR 4/6) very gravelly sand; single grained; loose; 40 percent rounded gravel and 5 percent cobbles by volume; common fine and medium flakes of mica; slightly acid; abrupt wavy boundary.

C2--41 to 60 inches; multicolored very gravelly sand; single grained; loose; 40 percent rounded gravel and 10 percent cobbles by volume; common fine and medium flakes of mica; medium acid.

TYPE LOCATION: Jackson County, North Carolina; 3.2 miles east of Cullowhee; 1.25 miles northeast of intersection of N.C. Highway 107 and Secondary Road 1737; and 200 feet south of intersection of Secondary Roads 1737 and 1740 in a cultivated field.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 20 to 39 inches. The soil is underlain within depths of 20 to 40 inches, by horizons that contain more than 35 percent gravel and/or cobbles. The coarse-loamy material above the C horizon averages less than 50 percent

fine and coarser sand. Rock fragments, dominantly gravel size are in the A and B horizons of some pedons, but comprise less than 35 percent by volume. Reaction ranges from very strongly acid to neutral. Content of mica flakes is few to many.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 2 or 3. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. In some pedons, there is a recently deposited thin layer of sandy overwash.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Mottles of chroma 2 or less are below a depth of 20 inches in some pedons. This horizon is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon is multicolored or has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8. It is loamy sand, loamy fine sand, coarse sand, or sand in the fine-earth fraction.

COMPETING SERIES: There are no other series in this family. The Newfields series is in a closely related family. Newfields soils have an ochric epipedon.

GEOGRAPHIC SETTING: Reddies soils are on nearly level, relatively narrow flood plains in the upper reaches of watersheds in the Blue Ridge (MLRA 130). Elevation ranges from about 1200 to 2200 feet. The soils formed in alluvium that is loamy in the upper part and is moderately deep to sandy strata containing more than 35 percent by volume of gravel and/or cobbles. Mean annual precipitation ranges from about 45 to 65 inches, and mean annual temperature ranges from 46 to 57 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Biltmore, Cullowhee, Dellwood, Dillard, Nikwasi, Rosman, Statler, and Toxaway soils. Biltmore, Cullowhee, Dellwood, Nikwasi, Rosman, and Toxaway soils are on flood plains. Biltmore soils are in a sandy particle-size class. Cullowhee soils are somewhat poorly drained. Dellwood soils are in a sandy-skeletal particle-size class. Nikwasi and Toxaway soils are poorly and very poorly drained. Rosman soils are in a coarse-loamy particle-size class. Dillard and Statler soils are on stream terraces and have argillic horizons.

DRAINAGE AND PERMEABILITY: Moderately well drained; the seasonal high water table is at depths of 2 to 3.5 feet in winter and spring. Runoff is slow. Flooding frequency ranges from rare to frequent. Permeability is moderately rapid in the A and B horizons, and rapid in the C horizon.

USE AND VEGETATION: Nearly all of the acreage is cleared and is used for hay, corn, pasture, truck crops, ornamentals, and urban uses. The rest is mainly in hardwood forest. Yellow-poplar, sycamore, red maple, and river birch are the dominant trees. Common understory plants are rhododendron, ironwood, flowering dogwood, red maple, tag alder, greenbrier, and switchcane. A few areas have been planted to eastern white pine.

DISTRIBUTION AND EXTENT: North Carolina and possibly Virginia, South Carolina, Tennessee, and Georgia. This series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Macon County, North Carolina, 1990. The name is from the Reddies River in Wilkes County, North Carolina.

REMARKS: The Reddies series was formerly included with the Rosman and French series. However, Rosman soils are deeper than 40 inches to sandy-skeletal strata and French soils are in a fine-loamy over sandy or sandy-skeletal family and have an ochric epipedon. The July 1990 revision changed the classification to coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Haplumbrepts. The series was previously in a coarse-loamy family. Lab data indicates that a dominance of soils mapped Reddies average less than 50 percent fine and coarser sand in the coarse-loamy part of the particle-size control section.

The following diagnostic horizons and features are recognized in this pedon:

Umbric epipedon - The zone from the surface to 14 inches (Ap horizon).

Cambic horizon - The zone from 14 inches to 26 inches below the surface (Bw horizon).

Contrasting particle-size classes - Coarse-loamy material overlying sandy-skeletal material at a depth of 26 inches.

ADDITIONAL DATA:

NASIS Data Map Unit ID: NASIS data for the typical pedon in Jackson County, NC are represented by DMU #369446.

SIR: NC0193

MLRA: 130

National Cooperative Soil Survey
U.S.A.

ROSMAN

LOCATION ROSMAN NC

Established Series
Rev. DLN-HJB-AG
04/2001

ROSMAN SERIES

The Rosman series consists of very deep, well drained to moderately well drained, moderately rapidly permeable soils on flood plains in the Southern Appalachian Mountains. They formed in loamy alluvium. Average annual precipitation is about 65 inches and mean annual temperature is about 53 degrees F., near the type location. Slopes range from 0 to 3 percent.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Fluventic Humic Dystrudepts

TYPICAL PEDON: Rosman loam--cultivated. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 10 inches; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; very friable; few fine flakes of mica; slightly acid; clear smooth boundary. (6 to 15 inches thick)

A--10 to 15 inches; dark brown (10YR 3/3) loam; weak fine and medium granular structure; very friable; few fine flakes of mica; slightly acid; clear smooth boundary. (4 to 8 inches thick)

Bw1--15 to 21 inches; dark yellowish brown (10YR 4/4) loam; massive; very friable; common fine flakes of mica; strongly acid; clear smooth boundary. (0 to 10 inches thick)

Bw2--21 to 35 inches; dark yellowish brown (10YR 4/4) fine sandy loam; few medium distinct grayish brown (10YR 5/2) mottles; massive; very friable; common fine flakes of mica; strongly acid; clear smooth boundary. (0 to 16 inches thick)

Bw3--35 to 50 inches; dark yellowish brown (10YR 4/4) fine sandy loam; many medium distinct grayish brown (10YR 5/2) mottles in lower portions; massive; very friable; common fine flakes of mica; strongly acid; clear smooth boundary. (0 to 16 inches thick)

C--50 to 60 inches; stratified sand and gravel; single grained; strongly acid.

TYPE LOCATION: Transylvania County, North Carolina. About 3 miles east of Brevard, 1/4 mile northwest of Pisgah Forest Post Office, in cultivated field 200 feet east of abandoned church.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 35 to 60 inches or more. The soil ranges from strongly acid to neutral in the A and upper Bw or C horizons and from strongly

acid to slightly acid in the lower horizons. Content of flakes of mica ranges from few to many. The loamy horizons extend to depths of at least 40 inches. Strata of contrasting textures may occur in the C horizon below a depth of 40 inches. Gravel content is less than 15 percent by volume in the upper 40 inches and may range up to 50 percent in horizons below 40 inches.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3. The A horizon is loam, silt loam, sandy loam, very fine sandy loam, or fine sandy loam. Some pedons have an Ab horizon that has the same color and texture range as the A horizon.

The Bw horizon where present, has hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 3 to 8. Few to many mottles of chroma 2 or less are below a depth of 20 inches in some pedons. Texture is loam, fine sandy loam, sandy loam, very fine sandy loam, or silt loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8. Mottles, if they occur, are in shades of red, brown, yellow, olive, or gray. Texture is variable, ranging from coarse sand to loam in the fine-earth fraction. Strata containing 15 to 50 percent by volume gravel and cobbles are below a depth of 40 inches in some pedons.

COMPETING SERIES: These are the Edgewick and Nekoma series in the same family and the Barbourville, Beulah, Codorus, Colvard, Comus, Congaree, Haywood, Reddies, Toccoa, Toxaway, and Transylvania series in closely related families. Edgewick and Nekoma soils formed in a midhumid maritime climate with mean annual precipitation from 70 to 80 inches. Barbourville and Transylvania soils are in a fine-loamy family. Beulah, Codorus, Colvard, Comus, Congaree, and Toccoa soils have an ochric epipedon. In addition, Congaree and Toccoa soils have a mean annual temperature of more than 59 degrees F. Haywood soils have umbric epipedons more than 20 inches thick. Toxaway soils have matrix colors of chroma 2 or less, have umbric epipedons thicker than 24 inches, and are in a fine-loamy family.

GEOGRAPHIC SETTING: Rosman soils are on nearly level flood plains in the Southern Appalachian Mountains. Elevation ranges from about 1200 to 2000 feet. These soils formed in alluvium which has been washed from soils formed from a variety of rocks such as granite, schist, gneiss, phyllite, slate, and metasandstone. Mean annual temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from about 45 to 70 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Reddies, Toxaway and Transylvania series, these are Biltmore, Colvard, Dillard, Hemphill, Iotla, Statler, Kinkora series. Biltmore, Colvard, and Iotla soils have an ochric epipedon and do not have a cambic horizon. Dillard, Hemphill, Kinkora, and Statler soils have argillic horizons and are on low terraces. Reddies soils are on flood plains along small streams. Toxaway soils are in depressed parts of the flood plains. Transylvania soils are in the same landscape positions as Rosman soils.

DRAINAGE AND PERMEABILITY: Well to moderately well drained; slow runoff; moderate internal drainage; moderately rapid permeability. Most areas of these soils are subject to occasional to frequent flooding. A few areas are protected by flood control structures and are subject to rare flooding.

USE AND VEGETATION: Most of the acreage is cleared and in cultivation. The chief crops are corn, truck crops, hay, ornamentals, Christmas trees, and pasture grasses. In forested areas common trees are yellow-poplar, eastern white pine, American sycamore, river birch, red maple, northern red oak, willow oak, and black walnut. Understory plants include rhododendron, ironwood, flowering dogwood, alder, greenbrier, and switchcane.

DISTRIBUTION AND EXTENT: North Carolina, Virginia, and possibly Tennessee. This series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Henderson County, North Carolina; 1974.

REMARKS: The July, 1991 revision recognizes that a cambic horizon is not required, although many pedons of Rosman have a cambic horizon.

Diagnostic horizons and features recognized in this pedon are:

Umbric epipedon - the zone from the surface to a depth of 15 inches (Ap and A horizons)

Cambic horizon - the zone from 15 to 50 inches (Bw1, Bw2, and Bw3 horizons). This is not a required diagnostic horizon for the Rosman series.

MLRA=130 SIR=NC0024

National Cooperative Soil Survey
U.S.A.

SAUNOOK

LOCATION SAUNOOK

NC+GA VA

Established Series

LBH:STE:AG; Rev. MKC

03/2004

SAUNOOK SERIES

The Saunook series consists of very deep, well drained, moderately permeable soils on benches, fans, and toe slopes in coves in the Blue Ridge (MLRA 130). They formed in colluvium derived from materials weathered from felsic to mafic, igneous and high-grade metamorphic rocks. Slope ranges from 2 to 60 percent. Near the type location, mean annual temperature is 53 degrees F. and mean annual precipitation is 55 inches.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, mesic Humic Hapludults

TYPICAL PEDON: Saunook loam, on a 21 percent slope in an apple orchard. (Colors are for moist soil unless otherwise indicated.)

Ap--0 to 9 inches; dark brown (10YR 3/3) loam; brown (10YR 4/3) dry; weak fine and medium granular structure; very friable; many fine and few medium and coarse roots; 3 percent cobbles and 3 percent gravel; few fine flakes of mica; moderately acid; abrupt smooth boundary. (7 to 15 inches thick)

Bt1--9 to 28 inches; dark yellowish brown (10YR 4/6) loam; weak medium subangular blocky structure; friable; common fine and few medium and coarse roots; few faint clay films on faces of peds and in pores; 4 percent gravel, 3 percent cobbles, and 1 percent stones; common fine flakes of mica; slightly acid; gradual wavy boundary. (8 to 24 inches thick)

Bt2--28 to 34 inches; dark yellowish brown (10YR 4/6) cobbly loam; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds and in pores; 15 percent cobbles, 10 percent gravel, and 5 percent stones; common fine flakes of mica; slightly acid; gradual wavy boundary. (5 to 22 inches thick)

BC--34 to 65 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak fine subangular blocky structure; very friable; 12 percent cobbles, 10 percent gravel, and 3 percent stones; common fine flakes of mica; moderately acid.

TYPE LOCATION: Haywood County, North Carolina; 1.0 mile east from Waynesville on U.S. Highway 276; 0.7 mile south on SR 1130; 0.1 mile south on orchard road; 120 feet north of road in apple orchard.

RANGE IN CHARACTERISTICS: Solum thickness is 40 to more than 60 inches. Depth to bedrock is greater than 60 inches. Content of mica flakes is few or common. Rock fragment

content is less than 35 percent in the A and Bt horizons, and ranges to 60 percent in the BC and C horizon, where present. The fragments range in size from gravel to stones. Reaction ranges from extremely acid to moderately acid in the A horizon, unless the soil has been limed. It is very strongly acid to slightly acid the Bt and C horizons.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 to 4; or hue of 7.5YR, value of 3, and chroma of 2 to 4. Dry value is less than 6. The Ap or A horizon is fine sandy loam, sandy loam, loam, silt loam, sandy clay loam, or clay loam in the fine earth fraction.

The BA or BE horizon, where present, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam, loam, sandy loam, loam, silt loam, or sandy clay loam in the fine earth fraction.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons, part of the Bt horizon may have hue of 5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, clay loam, sandy clay loam, or silt loam in the fine earth fraction.

The BC horizon is similar in color to the Bt horizon. It is coarse sandy loam, fine sandy loam, sandy loam, loam, silt loam, or sandy clay loam in the fine earth fraction.

The C horizon, where present, is colluvial material that is loamy or sandy in the fine earth fraction and is variable in color.

COMPETING SERIES: Excluding CEC activity class, these are the Colts Neck, Pineola, Royce, Snowbird, Statler, and Trimont series. Colts Neck soils contain glauconite and fragments of iron cemented sandstone. Pineola soils have paralithic contact at depths of 20 to 40 inches. Royce soils contain more silt and have fragments of shale. Snowbird soils formed in residuum from low grade metasedimentary rocks and contain fragments of these rocks. Statler soils formed in alluvium on terraces, may flood, and have a lower content of rock fragments. Trimont soils formed in residuum and have C horizons of saprolite.

GEOGRAPHIC SETTING: Saunook soils are on gently sloping to steep toe slopes, benches, and fans in coves in the Blue Ridge (MLRA 130). Slope is commonly 5 to 25 percent, but ranges from 2 to 60 percent. Elevation ranges from about 1,400 to 4,500 feet. Saunook soils formed in colluvium derived from materials weathered from felsic to mafic, igneous and high-grade metamorphic rocks such as granite, mica gneiss, hornblende gneiss, high-grade metagraywacke, and schist. Mean annual temperature ranges from 46 to 57 degrees F., and mean annual precipitation ranges from about 45 to 65.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Statler and Trimont soils, these are the Braddock, Brevard, Cashiers, Chandler, Cowee, Cullasaja, Dillsboro, Evard, Fannin, Hayesville, Sylva, Tate, Thunder, Tuckasegee, Tusquitee, Unison, and Whiteside series. Braddock, Dillsboro, and Unison soils are in a fine particle-size class. Brevard, Tate and Unison soils have thinner or lighter colored A horizons. Cashiers, Chandler, Cowee, Evard, Fannin, and Hayesville soils formed in residuum and have C horizons of saprolite. Cullasaja and Thunder

soils are in a loamy-skeletal particle-size class. Tuckasegee and Tusquitee soils have a cambic horizon.

DRAINAGE AND PERMEABILITY: Well drained; saturated hydraulic conductivity is moderately high or high, permeability is moderate. Surface index runoff is negligible to medium. These soils receive surface and subsurface water from surrounding uplands, and seeps and springs are common.

USE AND VEGETATION: Much of this soil has been cleared and is used for orchards, corn, burley tobacco, small grain, truck crops, ornamentals, and pasture, as well as urban development. Common trees are yellow poplar, northern red oak, white oak, yellow buckeye, black cherry, black birch, white ash, cucumbertree, and black locust. Understory plants include mountain-laurel, black locust, rhododendron, greenbrier, flowering dogwood, red maple, poison-ivy, grape, honeysuckle, sourwood, switchcane, and Christmas fern.

DISTRIBUTION AND EXTENT: North Carolina, Tennessee, and possibly Georgia, Virginia, and South Carolina. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Macon County, North Carolina, 1990. The name is from the Saunook community, near the type location in Haywood County, North Carolina.

REMARKS: The Saunook series was formerly included with the Tate and Tusquitee series. However, Tate soils have an ochric epipedon that has higher color value, and Tusquitee soils have a cambic horizon.

ADDITIONAL DATA:

MLRA: 130 **SIR:** NC0195, NC0282 (SILTY)

The Saunook series has the following diagnostic horizons and features:

Ochric epipedon - The zone from the surface to a depth of 9 inches (Ap horizon)

Humic Hapludults subgroup feature - Moist value of 3 and dry value of 4 in the Ap horizon (0 to 9 inches)

Argillic horizon - The zone from 9 to 34 inches (Bt1 and Bt2 horizons)

National Cooperative Soil Survey
U.S.A.

THURMONT

LOCATION THURMONT

VA+GA MD NC

Established Series

JHE, JHW; Rev. MKC

01/2000

THURMONT SERIES

Soils of the Thurmont series are very deep and well drained soils. They formed in alluvial and colluvial materials on footslopes, colluvial fans, benches, and stream terraces. Permeability is moderate. Slopes range from 2 to 35 percent. Mean annual precipitation is about 43 inches and mean annual temperature is about 57 degrees, F.

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic Oxyaquic Hapludults

TYPICAL PEDON: Thurmont loam - forested. (Colors are for moist soil.)

0i--0 to 2 inches; partially decomposed and fresh leaves twigs of deciduous trees.

0e--2 to 4 inches; very dark gray partially decomposed organic matter.

A--4 to 5 inch; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; very friable; many fine and medium roots; 2 percent rounded and angular gravel; strongly acid; clear abrupt boundary. (1 to 6 inches thick)

E--5 to 13 inches; yellowish brown (10YR 5/6) loam; weak fine and very fine granular structure; very friable; many fine and medium roots; 2 percent rounded and angular gravel and cobblestones; very strongly acid; clear smooth boundary. (0 to 10 inches thick)

Bt1--13 to 18 inches; strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and medium roots; few fine and medium pores; few thin clay films on faces of peds; common rounded and angular gravel and cobblestones; very strongly acid; clear smooth boundary.

Bt2--18 to 34 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few fine and medium pores; few distinct clay films on faces of peds; 10 percent rounded and angular gravel and cobblestones; very strongly acid; clear smooth boundary.

Bt3--34 to 40 inches; strong brown (7.5YR 5/6) clay loam; few medium distinct yellowish red (5YR 5/6) and red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky, slightly plastic; few fine roots; few fine and medium pores; common distinct clay films on faces of peds; 10 percent rounded and angular cobblestones; very strongly acid; gradual smooth boundary.

Bt4--40 to 52 inches; yellowish red (5YR 4/8) sandy clay loam; common medium distinct red (2.5YR 4/8), strong brown (7.5YR 5/8) masses of iron accumulation, and grayish brown (2.5Y 5/2) iron depletions; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; few distinct clay films on faces of peds; 10 percent rounded and angular cobblestones; very strongly acid; gradual smooth boundary. (combined thickness of Bt horizon is 20 to 50 inches)

C1--52 to 64 inches; strong brown (7.5YR 5/6) cobbly sandy loam; many coarse distinct yellowish brown (10YR 5/8) and yellowish red (2.5YR 4/8) mottles; massive; friable; 25 percent rounded and angular cobblestones; very strongly acid; gradual wavy boundary. (0 to 15 inches thick)

2C2--64 to 76 inches; yellowish red (5YR 5/6), strong brown (7.5YR 5/6), very pale brown (10YR 8/2), and black (10YR 2/1) granitic sandy loam saprolite.

TYPE LOCATION: Madison County, Virginia; on North side of VA 613, 100 yards west of VA 230.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 40 to 60 inches. Depth to hard bedrock is more than 60 inches. Where present, depth to a lithologic discontinuity ranges from 30 to 80 inches. Rock fragments of partially rounded and angular quartzite, granite, and other crystalline rocks up to 10 inches in diameter range from 0 to 50 percent in the A and C horizons and from 0 to 35 percent in the B horizon. The soil is very strongly or strongly acid, unless limed.

The A or Ap horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 6. Horizons with value of 3 and chroma of 2 or 3 are less than 6 inches thick. The A horizon is sandy loam, fine sandy loam, or loam that in the fine earth fraction.

The AB or BA horizon, where present, has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 6. The AB or BA horizon is sandy loam, fine sandy loam, or loam that in the fine earth fraction.

The E horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 6. The E horizon is sandy loam, fine sandy loam or loam in the fine earth fraction.

The BE horizon, where present, has hue of 7.5YR or 10YR, value of 4 through 6 and chroma of 3 through 6. It is sandy loam, loam, sandy clay loam, or clay loam in the fine earth fraction.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. Iron depletions with chroma of 2 or less occur deeper than 24 inches of the upper boundary of the Bt horizon. Soft masses of iron accumulation in shades of yellow, brown, or red may also be present. It is loam, clay loam, or sandy clay loam in the fine earth fraction. The lower part of the Bt horizon is free of mottles in some pedons.

The BC horizon, where present, has matrix colors similar to the Bt horizon or it is streaked or mottled in shades of red, yellow, brown, and gray. It is generally coarser in texture and contains a higher content of rock fragments than the Bt horizon. It is sandy loam, loam, or sandy clay loam in the fine earth fraction.

The C horizon commonly is streaked or mottled with hue of 2.5YR through 10YR, value of 2 through 8 and chroma of 1 through 7. It ranges from sandy loam to clay in the fine earth fraction.

The 2C horizon, where present, has matrix colors and textures similar to the C horizon.

COMPETING SERIES: Soils in the same family include the Chilmark, Hassler, Roselle, and Tulip series. The Birdsboro and Brumbaugh series are in closely related families. Chilmark soils formed in a loamy or sandy aeolian mantle over coastal plain sediments on the islands of Nantucket and Martha's Vineyard in MLRA 149B. Hassler soils are deep to granite bedrock and formed in colluvium and residuum on mountain ridges in the Ozark Highland area (MLRA 116A). Roselle soils formed in colluvium and residuum from granite on terraces and footslopes in mountain basins in the Ozark Highland area (MLRA 116A). Tulip soils formed in colluvium from sandstone and siltstone and in residuum from underlying shale in south-central Indiana (MLRA 120). The Birdsboro soils formed in old alluvial deposits from shale, sandstone, or siltstone. The Brumbaugh soils formed in colluvium from metamorphic rocks and have a lithologic discontinuity from 30 to 60 inches.

GEOGRAPHIC SETTING: Thurmont soils are on footslopes, colluvial fans, benches, and stream terraces in the Blue Ridge mountains (MLRA 130) and Northern Piedmont (MLRA 148). Slopes range from 2 to 35 percent, but commonly are 2 to 15 percent. The soils developed in colluvium and alluvium derived from a mixture of metamorphic rocks. Mean annual temperature ranges from 52 degrees to 57 degrees. Average annual precipitation ranges from about 40 to 62 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These include the Braddock, Dillard, Eubanks, Meadowville, Statler, Tate, Trego and Unison soils. Braddock and Unison soils have a fine particle-size control section. Dillard soils have iron depletions within 24 inches of the top of the argillic horizon. Meadowville soils have a lithologic discontinuity within the control section with significant increase in sand content. Statler and Tate soils have a seasonal high water table greater than 6 feet. Trego soils have a fragipan.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid surface runoff; moderate permeability. Depth to a seasonal high water table is 3 to 6 feet.

USE AND VEGETATION: Approximately one-fourth of the acreage has been cleared and is used for cultivated crops and pasture. Crops include corn, small grain, hay, some apple and peach orchards, berries, and vegetable crops. Vegetation consists of white oak, black oak, hickory, wild cherry, beech, yellow-poplar, black gum, Virginia pine, dogwood and elm in forested areas.

DISTRIBUTION AND EXTENT: Georgia, Virginia, Maryland, North Carolina, and Pennsylvania; also possibly in South Carolina, and West Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Morgantown, West Virginia

SERIES ESTABLISHED: Frederick County, Maryland (Monocacy Soil Conservation District), 1940.

REMARKS: The 10/99 revision updates classification to the 8th Edition of Keys to Soil Taxonomy. Some pedons may have a semiactive CEC activity class, but the dominant CEC activity class is active. Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - zone from the mineral soil surface to 13 inches (A and E horizons)

Argillic horizon - zone between 13 and 52 inches (Bt horizons)

Base saturation, 60 inches below the mineral soil surface, is less than 35 percent.

SIR = VA0053, VA0243 (COBBLY), VA0010 (GRAVELLY)

MLRA = 130, 148

REVISED = 10/14/92 by MHC, 10/99 by MKC

National Cooperative Soil Survey
U.S.A.

TRIMONT

LOCATION TRIMONT NC

Established Series
DJT:JDV:AG; Rev. MKC
03/2004

TRIMONT SERIES

The Trimont series consists of very deep, well drained, moderately permeable soils on cool north- to east-facing or shaded side slopes and heads of coves in the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part and weathered from felsic to mafic high grade metamorphic rocks. Mean annual temperature is about 56 degrees F., and mean annual precipitation is about 48 inches near the type location. Slope ranges from 30 to 95 percent.

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic Humic Hapludults

TYPICAL PEDON: Trimont gravelly loam on a 60 percent northeast facing mountain side slope--forested. (Colors are for moist soil unless otherwise noted.)

Oi-- 2 to 0 inches; partially decomposed leaves, twigs, roots, and other deciduous plant material.

A1--0 to 3 inches; dark brown (7.5YR 3/2) gravelly loam; brown (7.5YR 4/2) dry; weak fine granular structure; very friable; many fine and medium, and common coarse roots; 15 percent gravel and 3 percent cobbles by volume; common fine flakes of mica; strongly acid; clear wavy boundary.

A2--3 to 10 inches; dark brown (7.5YR 3/4) gravelly loam; brown (7.5YR 4/4) dry; weak fine granular structure; very friable; common fine and medium, and few coarse roots; 12 percent gravel and 3 percent cobbles by volume; common fine flakes of mica; strongly acid; clear wavy boundary. (Combined thickness of the A horizons is 7 to 16 inches.)

Bt1--10 to 17 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent gravel by volume; common fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2--17 to 40 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; 10 percent gravel by volume; common fine flakes of mica; moderately acid; gradual wavy boundary. (Combined thickness of the Bt horizons is 10 to 40 inches.)

BC--40 to 65 inches; yellowish red (5YR 5/6) loam; weak medium subangular blocky structure; friable; few fine and medium roots; 10 percent gravel; common fine flakes of mica; moderately acid.

TYPE LOCATION: Jackson County, North Carolina; 0.25 miles south of Sylva on Buck Mountain; 800 feet southeast of Sylva TV antenna; State Plane coordinates are 620,000; 740,000E.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 27 to 60 inches. Depth to bedrock is more than 60 inches. Content of mica flakes is few or common. . Content of rock fragments ranges from 0 to 35 percent by volume. Reaction ranges from very strongly acid to moderately acid unless limed.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 to 4. The A horizon is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam, sandy clay loam, or loam in the fine-earth fraction.

The BC horizon has colors similar to the Bt horizon. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The C horizon, where present, is multicolored saprolite that has weathered from felsic to mafic high grade metamorphic rocks. It is typically sandy loam, fine sandy loam, or loam in the fine-earth fraction.

COMPETING SERIES: Excluding CEC activity class, these are the Colts Neck, Pineola, Royce, Saunook, Snowbird, and Statler series. Colts Neck soils contain glauconite and fragments of iron cemented sandstone. Pineola soils have paralithic contact at depths of 20 to 40 inches. Royce soils contain more silt and have fragments of shale. Saunook soils formed in colluvium and do not have C horizons of saprolite. Snowbird soils formed in residuum from low grade metasedimentary rocks and contain fragments of these rocks. Statler soils formed in alluvium on terraces, may flood, and have a lower content of rock fragments.

GEOGRAPHIC SETTING: Trimont soils are on cool, north- to east-facing or shaded steep and very steep side slopes and heads of coves in the Blue Ridge (MLRA 130). Slope is typically between 30 and 70 percent, but ranges from 30 to 95 percent. Elevation ranges from about 2,000 to 3,500 feet. Trimont soil formed in residuum that is affected by soil creep in the upper part, and weathered from felsic to mafic crystalline rocks such as mica gneiss, amphibolite, and hornblende gneiss. Mean annual temperature is about 56 degrees F., and mean annual precipitation is about 48 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Saunook soils, these include the Brevard, Cowee, Cullasaja, Evard, Fannin, Plott, Porters, Saunook, Tuckasegee, Tusquitee, and Whiteside soils. Brevard, Evard, and Fannin soils have lighter colored epipedons. Cowee soils have paralithic contact at depths of 20 to 40 inches. Cullasaja soils are in a loamy-skeletal particle-size class. Plott, Porters, Tuckasegee, and Tusquitee soils have acambic horizon. Whiteside soils have redoximorphic depletions within the Bt horizon.

DRAINAGE AND PERMEABILITY: Well drained; saturated hydraulic conductivity is moderately high or high, permeability is moderate. Index surface runoff is high.

USE AND VEGETATION: Most of this soil is forested. Common trees are yellow poplar, northern red oak, white oak, black oak, American beech, black locust, and red maple. Understory plants include flowering dogwood, rhododendron, mountain-laurel, black locust, blueberry, greenbrier, red maple, poison-ivy, sourwood, Virginia creeper, Solomon's seal, Christmas fern, and New York Fern.

DISTRIBUTION AND EXTENT: Blue Ridge (MLRA 130) of North Carolina, and possibly Georgia, Tennessee, and Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Macon County, North Carolina, 1990. The name is from Trimont Mountain located in the county.

REMARKS: The Trimont series was formerly included with the Evard and Porters series. However, Evard soils lack an epipedon with moist color value of 3 or less that is as thick as 6 inches. Also, they are not considered as productive for woodland as Trimont. Porters soils have a cambic horizon. and lithic contact at depths of 40 to 60 inches..

The following diagnostic horizons and features are recognized in the typical pedon:

Ochric epipedon - The zone from the surface to 10 inches (A1 and A2 horizons).

Humic Hapludults subgroup - The zone from the soil surface to 10 inches which has moist color value of 3 (A1 and A2 horizons).

Argillic horizon - The zone from 10 inches to 40 inches below the surface (Bt horizon).

National Cooperative Soil Survey
U.S.A.

TUCKASEGEE

LOCATION TUCKASEGEE NC+GA

Established Series
Rev. DJT-AG
04/2001

TUCKASEGEE SERIES

The Tuckasegee series consists of very deep, well drained soils on gently sloping to very steep benches, foot slopes, toe slopes, drainageways, and fans in coves in the Southern Appalachian Mountains. These soils formed in colluvium derived from materials weathered from igneous and metamorphic crystalline rocks such as granite, mica gneiss, hornblende gneiss, and schist. Near the type location, mean annual air temperature is about 52 degrees F., and mean annual precipitation is about 70 inches. Slope ranges from 2 to 95 percent.

TAXONOMIC CLASS: Fine-loamy, isotic, mesic Humic Dystrudepts

TYPICAL PEDON: Tuckasegee fine sandy loam on a 30 percent southeast facing foot slope at an elevation of 3320 feet -- Forested. (Colors are for moist soil unless otherwise stated.)

Oi--2 to 0 inches; partially decomposed deciduous leaves, twigs and roots.

A1--0 to 9 inches; black (10YR 2/1) fine sandy loam; dark brown (10YR 3/3) dry; moderate fine and medium granular structure; very friable; many fine, common medium, and few coarse roots; 5 percent gravel by volume; few fine flakes of mica; strongly acid; clear smooth boundary.

A2--9 to 13 inches; dark brown (7.5YR 3/2) fine sandy loam; brown (7.5YR 4/2) dry; moderate coarse granular and weak fine and medium granular structure; very friable; common fine to coarse roots; 5 percent gravel by volume; few fine flakes of mica; very strongly acid; gradual wavy boundary. (Combined thickness of the A horizon is 10 to 20 inches.)

Bw1--13 to 26 inches; dark brown (7.5YR 3/4) fine sandy loam; weak medium subangular blocky structure; friable; common medium to coarse roots; 5 percent gravel, 5 percent cobbles by volume; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2--26 to 47 inches; brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; friable; few medium to coarse roots; 5 percent gravel, 5 percent cobbles, 15 percent stones by volume; few fine flakes of mica; strongly acid; gradual wavy boundary. (Combined thickness of the Bw horizons is 30 to 51 inches.)

BC--47 to 65 inches; strong brown (7.5YR 4/6) cobbly sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; 10 percent gravel, 15 percent cobbles, 30 percent stones by volume; few fine flakes of mica; strongly acid.

TYPE LOCATION: Macon County, North Carolina; 3.0 miles west of Coweeta Hydrologic Station Office on Shope Creek road; 150 feet upslope from hairpin curve; in the woods, 400 feet east of weir on Watershed No. 36.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 40 to more than 60 inches. Depth to bedrock is more than 72 inches. Reaction is very strongly acid to slightly acid, in the A horizon, unless limed. The Bw and lower horizons are very strongly acid to moderately acid. In the upper 40 inches, content of rock fragments, dominantly of gravel to stone size, ranges up to 35 percent. Below 40 inches, rock fragment content may range up to 60 percent. Content of mica flakes ranges from few to common.

The A or Ap horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

A thin AB horizon is in some pedons. It has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4, but does not meet the color requirements for an umbric epipedon. It is fine sandy loam, sandy loam, or loam in the fine-earth fraction.

The Bw horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, sandy clay loam, or loam in the fine-earth fraction.

The BC horizon, where present, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam, sandy loam, sandy clay loam, or loam in the fine-earth fraction. Rock fragment content is usually more than that of the Bw horizon in the same pedon.

The C horizon, where present, is colluvium that is similar in color to the BC horizon or is multicolored. It is fine sandy loam, sandy loam, coarse sandy loam, loam, loamy fine sand, loamy sand, or loamy coarse sand in the fine-earth fraction. Rock fragment content is typically 15 to 60 percent.

COMPETING SERIES: These are the Barbourville, Bohannon, Cutshin, Hembre, Horeb, Meda, Molalla, Preacher, Stevenson, and Wadell series. Barbourville, Bohannon, Horeb, and Meda soils have sola less than 40 inches thick. Cutshin soils formed from colluvium weathered from sedimentary rocks such as sandstone, shale, and siltstone, and contain fragments of those rocks. Hembre soils have B horizons with dominantly 5YR hue, and contain basalt fragments. Molalla soils formed from colluvium weathered from tuffs, breccia, and andesite; have bedrock within depths of 40 to 60 inches; and have warm dry summers and cool wet winters. Preacher soils have average annual precipitation of 80 to 120 inches. Stevenson soils formed from colluvium weathered from basalt and andesite, contain fragments of those rocks, and have warm dry summers and cool wet winters. Wadell soils have average annual precipitation of 70 to 100 inches with relatively cool summers (mean July temperature of 63 degrees F.) and mild wet winters (mean January temperature of 38 degrees F.).

Haywood, Plott, Porters, Santeetlah, Saunook, and Tusquitee are series in closely related families. All except Saunook are in a coarse-loamy family. Haywood soils have umbric epipedons that are more than 20 inches thick. Porters soils have A horizons of umbric color that

are 6 to 10 inches thick. Plott and Porters soils formed in residuum with some creep in the upper part. Santeetlah soils formed in materials weathered from metasedimentary rocks and contain fragments of those rocks. Saunook soils have an argillic horizon. Tusquitee soils have A horizons of umbric color that are 7 to 10 inches thick.

GEOGRAPHIC SETTING: Tuckasegee soils are on benches, foot slopes, toe slopes, drainageways, and fans in coves in the Southern Appalachian Mountains. Elevations are generally between 2,000 and 4,500 feet. Slopes are commonly between 15 and 50 percent but range from 2 to 95 percent. These soils formed in loamy colluvium derived from materials weathered from igneous and metamorphic crystalline rocks such as granite, mica gneiss, hornblende gneiss, and schist. Tuckasegee soils receive moisture from surrounding uplands, and springs and local seepage areas are common. Climate is temperate and humid. Near the type location, the mean annual air temperature is about 52 degrees F., and the mean annual precipitation is about 70 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: In addition to the competing Haywood, Plott, Porters, Saunook, and Tusquitee series, these are the Ashe, Cashiers, Chandler, Chestnut, Cowee, Cullasaja, Edneyville, Evard, Fannin, Haywood, Saluda, Sylva, Tate, Trimont, Watauga, and Whiteside soils. Ashe, Cashiers, Chandler, Chestnut, Cowee, Edneyville, Evard, Fannin, Plott, Porters, Saluda, Trimont, and Watauga soils formed in residuum with some soil creep in the upper part, have C horizons in saprolite, and are on locally higher mountain ridgetops and side slopes. Brevard, Saunook, and Tate soils formed in colluvium in the same colluvial landscape position as Tuckasegee soils, but they have argillic horizons. Cullasaja, Haywood, and Tusquitee soils are in the same colluvial landscape position also, but Cullasaja soils are loamy-skeletal; Haywood soils have umbric epipedons thicker than 20 inches and are coarse-loamy; and Tusquitee soils have umbric colored A horizons 7 to 10 inches thick, and are coarse-loamy. Sylva and Whiteside soils are in seepage areas of toe slopes and fans. Sylva soils are poorly drained and Whiteside soils are moderately well drained.

DRAINAGE AND PERMEABILITY: Well drained; very little runoff where the forest litter has not been disturbed or only partly disturbed; medium to rapid runoff where litter has been removed; moderately rapid permeability.

USE AND VEGETATION: About one-half of the acreage has been cleared and is used for corn, small grain, tobacco, truck crops, clover, lespedeza, and pasture. Wooded areas consist mostly of yellow poplar, white oak, northern red oak, black locust, white ash, black birch, eastern white pine, eastern hemlock, black cherry, cucumbertree, yellow buckeye, American beech, and sugar and red maples. At elevations above 4,000 feet, yellow birch replaces yellow poplar as a common tree.

DISTRIBUTION AND EXTENT: Southern Appalachian Mountains of North Carolina, and possibly Tennessee and Virginia. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Macon County, North Carolina; 1990.

REMARKS: This series was previously included with the Tusquitee series. However, Tusquitee soils have umbric colored A horizons 7 to 10 inches thick and are Coarse-loamy, mixed, mesic Umbric Dystrochrepts. National Soil Survey Lab data (NSSL #86P0742) is available for the typical pedon. That data and other data indicate that these soils are generally marginal to the coarse-loamy family. The 6/90 revision of the series changes the classification from coarse-loamy to fine-loamy, mixed, mesic Typic Haplumbrepts.

Diagnostic horizons and features in this pedon are:

Umbric epipedon - 0 to 13 inches (A1 and A2 horizons)

Cambic horizon - 13 to 47 inches (Bw1, Bw2, Bw3 horizons)

National Cooperative Soil Survey
U.S.A.

UNAKA

LOCATION UNAKA

TN+NC

Established Series

Rev. NTH-DEL-DHK

04/2001

UNAKA SERIES

The Unaka series consists of moderately deep, well drained, loamy soils formed in residuum from granite and gneiss. They are mainly at high mountain elevations. Slopes range from about 10 to 60 percent.

TAXONOMIC CLASS: Fine-loamy, isotic, mesic Typic Dystrudepts

TYPICAL PEDON: Unaka loam on a forested east-facing 25 percent slope. (Colors are for moist soil unless otherwise stated.)

A1 -- 0 to 3 inches; very dark brown (10YR 2/2) loam; weak medium and fine granular structure; very friable; many fine and medium roots; common fine flakes of mica; 5 percent pebbles; strongly acid; clear smooth boundary. (0 to 9 inches thick)

A2 -- 3 to 8 inches; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many fine and medium roots; common fine flakes of mica; 5 percent pebbles; strongly acid; clear smooth boundary. (0 to 9 inches thick)

Bw1 -- 8 to 12 inches; dark yellowish brown (10YR 4/4) loam; weak medium and fine subangular blocky structure; many fine roots; common fine flakes of mica; 5 percent pebbles; strongly acid; clear smooth boundary.

Bw2 -- 12 to 24 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine roots; common fine flakes of mica; 10 percent pebbles; strongly acid; clear wavy boundary. (Combined thickness of the Bw horizons range from 6 to 18 inches thick.)

Cr -- 24 to 32 inches; granite saprolite that crushes to sandy loam; yellowish brown (10YR 5/4) loam in cracks and seams; strongly acid. (4 to 12 inches thick)

R--32 inches; hard granite bedrock.

TYPE LOCATION: Unicoi County, Tennessee; near top of Divide Mountain at elevation of 4400 feet; 200 yards north of field on abandoned road, 3 miles northeast of benchmark "Sugar"; (Coordinates could not be determined from the description for this revision).

RANGE IN CHARACTERISTICS: Depth to hard granite or gneiss ranges from 20 to 40 inches. Content of rock fragments in the A and B horizons ranges from about 5 to 20 percent and up to as much as 35 percent in the C horizon. Soil reaction is strongly acid or very strongly acid. Flakes of mica range from few to common throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. Texture of the fine earth is loam, fine sandy loam or sandy clay loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The fine earth is typically loam, but ranges to clay loam, sandy loam and sandy clay loam in some profiles.

The C horizon (where present) is multicolored saprolite, or has hue of 10YR, value of 5, and chroma of 4 to 6. Texture of the fine earth is sandy loam or loam.

COMPETING SERIES: These include the Brookshire, Jeffrey, and Porters series in the same family, and the Ashe, Burton, and Crossville series in closely related families. Brookshire and Porters soils are deeper than 40 inches to bedrock. Jeffrey soils formed from arkosic sandstone. Ashe soils do not have the dark surface layer. Burton soils have dark surface layers 10 to 20 inches thick and are in a frigid temperature regime. Crossville soils have siliceous mineralogy and are underlain by sandstone.

Note: Competing series have not been updated since most of these will also require reclassification using the 7th Edition of Keys to Soil Taxonomy (1996).

GEOGRAPHIC SETTING: Unaka soils are commonly on high mountains and are underlain by granite and gneiss. Elevations range from 3600 to nearly 5000 feet. They are mainly on east and north aspects. Slopes range from 10 to 60 percent. Mean annual temperature ranges from about 50 to 55 degrees F., and mean annual precipitation is about 46 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Brookshire, Porters and Crossnore (proposed) series and the related Ashe, Burton and Edneytown series. Ashe and Porters soils commonly are at lower elevations and are on south and west aspects. Burton soils commonly are on the domes of high mountains. Brookshire soils are in the coves. Crossnore soils are moderately deep to soft bedrock (Cr). Edneytown soils, which have an argillic horizon, are at lower elevations on less steep slopes.

DRAINAGE AND PERMEABILITY: Well drained; moderate permeability. Runoff class is medium on strongly sloping or moderately steep slopes, and high on steeper slopes. Runoff is much lower where forest litter has little or no disturbance.

USE AND VEGETATION: Nearly all areas are in forest consisting chiefly of yellow-poplar, black cherry, oaks, hemlock, buckeye, yellow birch, black birch, beech, and white pine. Cleared areas are used mostly for pasture.

DISTRIBUTION AND EXTENT: The Unaka mountain range in Tennessee and in North Carolina and possibly Virginia. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lexington, Kentucky

SERIES ESTABLISHED: Unicoi County, Tennessee; 1980.

REMARKS: The 1/97 revision placed Unaka soils in a fine-loamy family. This series was formerly placed in a coarse-loamy family. Laboratory PSA (pipette method) and corresponding field texture estimates (feel method) indicate control section clay contents of generally 12 to 24 percent, with most pedons marginally coarse-loamy. However, chemical lab data indicate that sufficient amorphous, clay-sized materials occur in the particle-size control section to place this soil in a fine-loamy family. Average clay contents are generally less than 25 percent.

This latest revision places Unaka soils in an isotic mineralogy class. Using the 7th Edition of Keys to Soil Taxonomy (1996), Unaka soils would classify as fine-loamy, isotic, mesic Andic Dystrochrepts. However, a proposal has been made to add an acid oxalate-extractable silicon requirement to Andic subgroups, which would exclude Balsam soils, which lack volcanic glass.

Additionally, textures were also modified in the range in characteristics for horizons within the solum.

Diagnostic horizons and features recognized in this pedon are:

Umbric epipedon: 0 to 8 inches (A1 and A2 horizons).

Cambic horizon: 12 to 24 inches (Bw horizons).

Lithic contact: hard bedrock at a depth of 32 inches (R).

Isotc mineralogy class - within the PSCS the soil generally has high amorphous materials (high pH-dependent charge) and a high moisture retention (at 1500 kPa) to clay ratio.

Properties that would place the soil in an Andic subgroup--a horizon or horizons with total thickness of 7 inches (18 cm) or more within 30 inches (75 cm) of the mineral soil surface with a fine-earth bulk density of 1.0 g/cm³ or less (at 33 kPa water retention) and ammonium oxalate extractable aluminum plus 1/2 iron percentages totaling more than 1.0.

Revised: 2/94-NTH,DEL; 1/97-DHK, 12/97-DHK

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